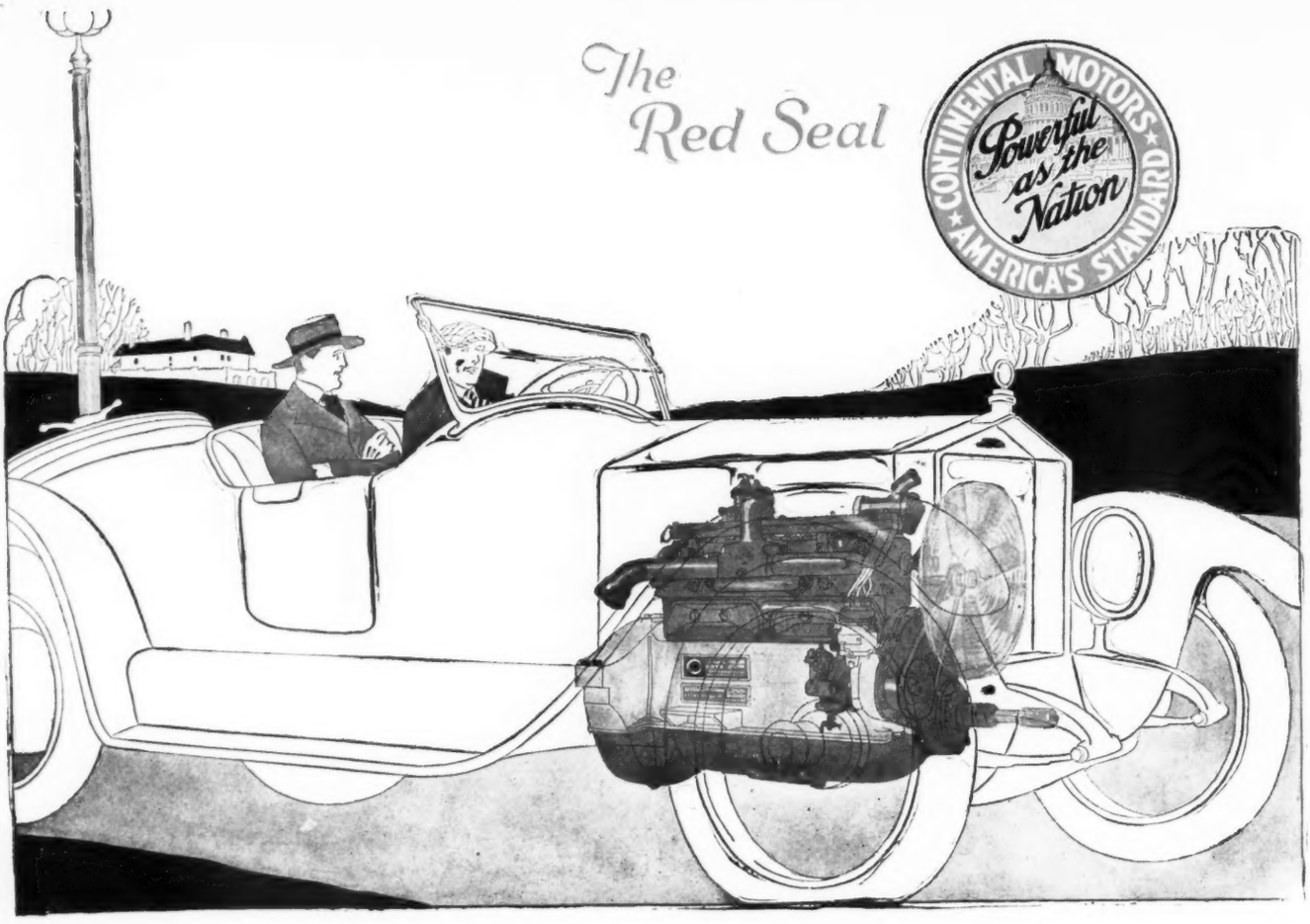
AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

Vol. XLI
Number 12

PUBLISHED WEEKLY AT 239 WEST 39th STREET
NEW YORK, SEPTEMBER 18, 1919

Twenty cents a copy
Three dollars a year

Entered as second-class matter Jan. 2, 1903, at the post office at New York, N. Y., under the Act of March 3, 1879.



How Can You Tell a Good Motor?

Upon the motor more than upon anything else depends your satisfaction with the automobile or truck you buy.

How can you tell a good motor? How can you know that it will stand up on the road under the grind of day-by-day usage?

How can you judge it for stamina, for staying power, for continuous dependable performance?

* * * * * * * *

You can, of course, examine the motor—you can see it demonstrated on the boulevards, on the hills, through traffic—you can ask questions about its design and its features.

But how can you be **sure?** How can you look ahead?

* * * * * * * *

There is only one true test of a good motor. That test is—TIME.

Know what the motor will do by asking what it has done. Know what the years have shown. Is the motor an "unknown quantity" or a **certainty**—a motor of proved worth?

* * * * * * * *

Consider these things—and your choice will be the Red Seal Continental Motor.

The Red Seal Continental has stood the test of time, and service—during more than fifteen years. It represents nothing untried, nothing experimental. Rather, it represents the co-ordinated thought of the foremost motor engineers, for more than a generation.

It is a **proved certainty.** It is America's Standard.

* * * * * * * *

Today 165 successful manufacturers of automobiles and trucks, by equipping their output with the Red Seal Continental motor, vouch for its integrity.

More than 16,000 dealers base their business prosperity, their business future, upon Continental-motored cars.

Hundreds of thousands of satisfied owners are living testimonials that the judgment of these manufacturers and dealers is **right.**

* * * * * * * *

When you buy an automobile or truck, choose a motor that TIME has proved—and identify it by the Continental Red Seal.

CONTINENTAL MOTORS CORPORATION

Offices: **Detroit, Michigan**
Factories: **Muskegon—Detroit**

Largest Exclusive Motor Manufacturers in the World

Continental Motors

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLI NEW YORK—THURSDAY, SEPTEMBER 18, 1919—CHICAGO NO. 12

Probable Duties of a Department of Aviation

A Probable Parallel of the Duties of a Department of Aeronautics Is Found in the Regulation of the Steam and Sail Navigation of To-day by the Department of Commerce. A Vision of the Future Will Show That Within a Few Years It Will Be Necessary to Develop for Aircraft All That Has Been Developed in More Than a Century for Ships. In addition There Is the Necessity for an Absolute Freedom in the Development and Consideration of Design of the Aircraft.

By Allen Sinsheimer

WASHINGTON, Sept. 15.

WOULD a "bureau" of aeronautics under the Department of Commerce operate as well as a separate Department of Aeronautics?

This question has been raised as the result of a suggestion in last week's AUTOMOTIVE INDUSTRIES for a Department of Aeronautics under a director, to function co-operatively with the Post Office, Navy and War Departments. It has been asked by some officials who believe that commercial aviation should primarily come under the Department of Commerce that perhaps the activities of a Department of Aeronautics will not be broad enough to warrant a separate control.

These officials would make a Bureau of Aeronautics to control general commercial and technical aviation and place it under the Secretary of the Department of Commerce operating on about the same plan as has been suggested in the last issue of this magazine, but without the direct control that would be given if aeronautics were in a separate department.

> Creation of a bureau of this kind under the Department of Commerce would, however, result in making the Department of Commerce as unwieldy and cumbersome as the British Air Ministry which the American Aviation Mission suggested this country should study as a possible model. It would also develop the same objectionable features that have been found in the suggestion for a united Air Service.

The Department of Commerce already controls the Bureau of Census, Bureau of Foreign and Domestic Commerce, Bureau of Standards, Bureau of Fisheries, Bureau of Lighthouses, Coast and Geodetic Survey, Bureau of Navigation, Steamboat-Inspection Service and other similar bureaus, all of which are large and important and already tend to make coordination of the Department difficult.

Furthermore, a Department of Aeronautics, although it will not directly enter into military, naval or postal aviation, will perhaps be of as much importance eventually as the entire Department of Commerce. For example, in the matter of navigation alone, aeronautics will probably require a bureau comparable to the present Bureau of Navigation of the Department of Commerce—a bureau that will probably combine the activities of the Bureau of Navigation, Lighthouses, Coast and Geodetic Survey and Steamboat-Inspection Service together. Navigation in the air will be a more complicated matter than navigation on sea.

In fact, it will be found that practically all of the activities for the control of sea navigation will be necessary for the control of air navigation. There will have to be regulations to prevent collision, for signals, for speed in fogs, for pilotage, for aircraft registration, etc., etc. As with steamers, it will be necessary to have rules for the display of lights of various colors and in different positions. It may be necessary in the case of airships to have regulations for the placing of lights to show when an airship is being towed or when an airship is at anchor. Airships may have to show lights on the quarter nearest the airplane if they are approaching one.

It may be necessary to have sound signals for fogs and heavy weather with varied signals for airplanes and airships. Airplanes might perhaps have such signals as three distinct blasts every minute, while the airship may denote its exact position by giving one blast if passing in one drection and two blasts if in the opposite direction, etc., in a method similar to that now used by ocean-going vessels.

There will have to be regulations for speed in heavy or foggy weather, for the passing of an airplane by an airship or passing of one airplane by another, or the passing of one airship by another, so that each may pass, for example, on the port side of the other by altering the course. It will be necessary also to define the rights of aircraft, which probably will result so that airplanes will have to keep out of the way of airships when both are traveling in such directions as to involve risk of collision.

The Lighthouse Service of the Department of Commerce publishes weekly notices of changes of signals, the construction of new lighthouses or the removal of a signal post. It will no doubt be necessary for the Department of Aeronautics to have some similar publication which will inform air pilots where to find their signals of location, danger, etc.

Aircraft will have to be registered and this will probably be done in a manner similar to the registration of vessels which are given certificates of registration and licenses, depending upon their size.

There will have to be rules for the flying of the American flag, perhaps similar to those used in the flying of American flags on vessels. Ocean-going vessels owned by American citizens can fly the flag of the United States without being documented, but cannot engage in trade at American ports without registration.

Great Britain does not regard a vessel as a British ship unless it is entirely owned by British subjects or by corporations subject to British laws, and it may be necessary for the United States to adopt some such view in regard to flying the American flag on aircraft. Another similar matter is that of the nationality of the crew. The United States demands that watch officers on vessels must be Americans. It may do likewise in the matter of aircraft crews.

Similarly the United States laws provide that no vessel can leave a port unless in a seaworthy condition. It subjects vessels to annual inspections.

They must be watertight, which in the air would be equivalent to being airworthy; they must have sufficient life boats and life saving equipment which with aircraft would be equivalent to a sufficient number of parachutes, and they must be soundly constructed as regards boilers, iron and steel plates, which in the air would call for sound construction of struts, planes, engines, etc. Inspection is made of all vessels in the United States and Great Britain once a year by local inspectors of the Steamboat Inspection Service, who go into all details of seaworthiness, accommodations for passengers and crew, compliance with the law in regard to fires, life boats, pumps, preservers, anchors, cables, signals, crews, interpreters, surgeons, deck construction, berths, stairways, light, ventilation, general character of cargo, etc. Undoubtedly similar inspections will have to be made of aircraft once they commence to engage in commercial flight in numbers.

Vessels must be loaded according to law and in Great Britain must be painted amidships with marks indicating the greatest draft to which the vessel should be loaded. Similarly aircraft will undoubtedly have to be marked to show the greatest weight that it can accommodate and the positions in which the weight can be best accommodated.

The United States Steamboat Inspection Service determines the number of officers required on each vessel, but is limited by local provisions specifying

IN reading this article, you are asked to think over the parallel. Would you, to-day, put all of the marine activities of this country into one department that would have absolute control, if the head of the department desired, of the design and construction of the aircraft? Would you, to-day, put the naval construction under the Department of Commerce? Would you permit the War Department to take charge of the Merchant Marine?

Aircraft looms largely as a problem of the future. Is it to be hampered by a lack of understanding or vision?

The question is not one of to-day but of the future. Are we going to permit it to develop as sail and steam navigation, or are we going to smother it?—Editor.

the maximum numbers. Great Britain goes further and stipulates the number of steerage passengers per ship and the number of deck hands that must man it, the latter being determined by the under-deck tonnage on sailing vessels, and the amount of horsepower of engines for engine room crews.

The age, physical condition, ability and experience of officers are inspected and examinations in algebra, geometry, trigonometry, winds and currents, nautical astronomy, nautical survey, etc., are given. Persons cannot be carried on board ship at United States ports as part of the crew unless they have previously signed agreements with the master of the vessel as to the duration of the voyage, hours of work, wages, etc.

> There can be no question but that similar regulations will have to be made in course of time for the control of air navigation. The sooner these regulations are established, the better. It would be well to start commercial aviation soundly by building it on the experience of sea navigation rather than to allow it to gradually find its course.

There will probably have to be a Commissioner of Navigation under the Division of Commercial Aviation in the Department of Aeronautics, who would have charge of the general superintendence of commercial airplanes in operation, their registration, their compliance with the laws relating to signals, communication, etc., collection of tonnage taxes if needed, preparation of annual reports, registration of names of aircraft, etc., etc.

The Commissioner may also have to control ports of call and ports of destination. It has been found that ocean and lake ports operating under public administration officials function best because all of the details are standardized, whereas when the ports are owned by private individuals or corporations there is confusion due to the varied standards, rates, etc. Ports or fields can be as well operated by cities or states as by the Department of Aeronautics, but at least there should be a Government body of laws which will regulate the rates and the methods of operation at all air ports within the boundaries of the country. These laws should include the supervision of pilotage charges, towage charges, port charges, cargoes, inspection of cargoes, quarantine fees, etc.

> **As a result of these activities it will readily be seen that a "bureau" of aeronautics as suggested by these officials would eventually prove to be a machine too big for the Department of Commerce and one which would unquestionably outgrow the Department. The only solution to the problem appears to be the immediate establishment of a Department of Aeronautics controlling commercial and technical aviation and working through the advisory council cooperatively with the Post Office, Army and Navy.**

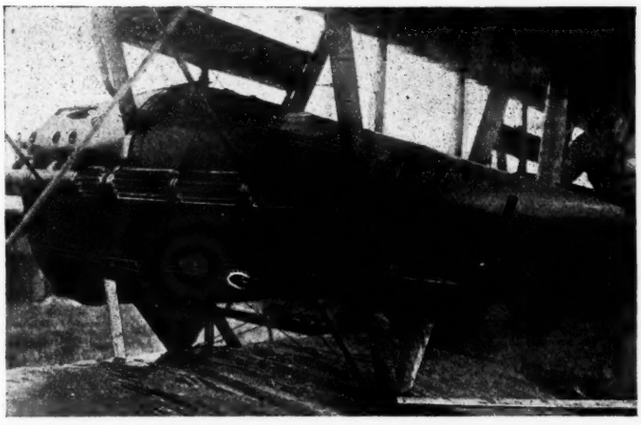
Aircraft Muffler Also Adapted to Automobile Engines

By W. F. Bradley

PARIS, August 28.

AFTER practical tests, the French Air Service has adopted the Schneebeli muffler, the claims for which are complete silence and the prevention of any flame reaching the open air.

This apparatus consists of a long tube with closed end, attached to and forming a continuation of the exhaust manifold. The tube has around its circumference a series of hollow longitudinal fins of triangular section. Communication is made from the interior of the tube to these fins by a series of holes about ⅛ in. in diameter. Along each face of the fins are cut a very large number of louvres through which the exhaust gases reach the open air.



Schneebeli muffler and flame arrester adopted by French Air Service

By reason of the fin construction and the shape of the louvres, a vacuum is formed, and a continuous suction created along the whole length of each fin. On the bench it was possible, by means of a brusque opening and closing of the throttle, to cause flames to appear on the outside of the exhaust pipe. With the machine in the open air, however, it was impossible to make flames project from the exhaust box.

The explanation is that when the machine is moving, or when the muffler is behind a propeller, the draft is so strong that flames are extinguished at the mouth of the louvres.

The tests showed a gain in power when using this apparatus compared with running with a straight exhaust manifold. Almost complete silence is obtained. The action of the wind and the escape of the gases cause a continuous whistling, but on the Farman plane with two engines, each of 280 hp., it was possible to carry on a conversation as conveniently as in a closed room.

The Schneebeli apparatus is also being used for automobile service. Instead of the usual type of muffler, a finned pipe the same diameter as the exhaust pipe is fitted. This added pipe has a vertical division midway on its length. Unlike the aviation type, there are no openings on the exterior of the hollow fins. The gases exhaust from the forward half of this chamber into the fins and from the fins into the interior of the rear half of the chamber. Weight is very low, for the apparatus consists only of a drilled tube with a series of added fins.

Constitutional Defect of Four-Cylinder Engine and Remedy

In this discussion of the American-European practices in building of motor car engines Mr. Pomeroy brings to bear his experiences with the Lanchester Anti-Vibrator, which has not been widely discussed and not entirely understood by all engineers in this country. Mr. Pomeroy was for years manager of the Vauxhall Co. and has ranked as one of the leading European engineers. He resigned from Vauxhall and is here as a consulting engineer. He has been a close associate of F. W. Lanchester.

By Laurence H. Pomeroy

IT is well known by automobile engineers and by almost every user of a four-cylinder car that the balance of an ordinary four-cylinder gasoline engine is far from perfect. At high speeds of revolution the vibration of a four-cylinder engine becomes quite a serious factor, both as affecting the comfort of a vehicle and as prejudicial to the durability of both chassis and bodywork; it is, in fact, on this want of balance of the four-cylinder engine that the demand for the six-cylinder engine is mainly based.

It is true that the six-cylinder engine, for a given power, has the advantage of more uniform torque; that is to say, for given mean torque less extremes of maximum and minimum, but the advantage of the six-cylinder engine in this respect is a secondary matter as compared with its advantage in the matter of smooth running as dependent upon more perfect balance.

There is no gainsaying the fact that the level of design attained in many continental and some English cars is of a very high order. The capacity of the car to do its work all on top gear possibly is not such a central feature in design in Europe as in America, but what the gear ratio lacks the engine, as a rule, makes up. The battle of 4 versus 6 in Europe was fought very thoroughly, and the four won, for the reason that the advantages in respect of balance and even torque did not compensate for increased mechanical complication, carburetion difficulties and increased gasoline consumption, to say nothing of the extra engine space required for the six-cylinder engine.

The improvement in balance and sweetness of running was, of course, very marked and desirable, but on the whole the European makers decided not to sacrifice efficiency for comfort. It is not unfair to say that in America the alternative choice was made.

The outstanding difference between the running of a four-cylinder engine and a six-cylinder lies in the fact that a four-cylinder engine is inherently unbalanced, while a six-cylinder is inherently balanced.

If it is possible to correct this defect of the four-cylinder engine the remaining essential difference is in respect of torque recoil, which amounts to little, as discussed by the author (see AUTOMOTIVE INDUSTRIES of Aug. 7, page 275) being dependent upon gear ratio and car weight.

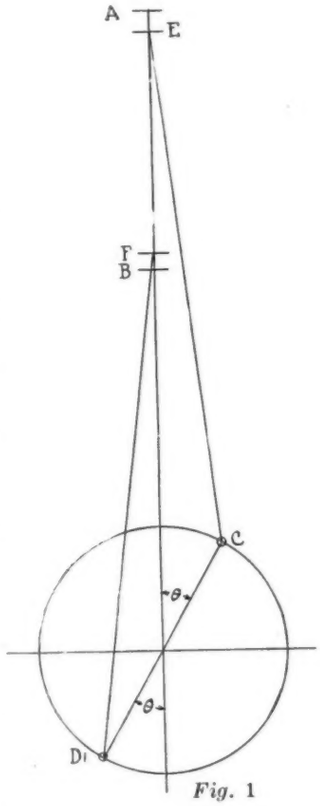


Fig. 1

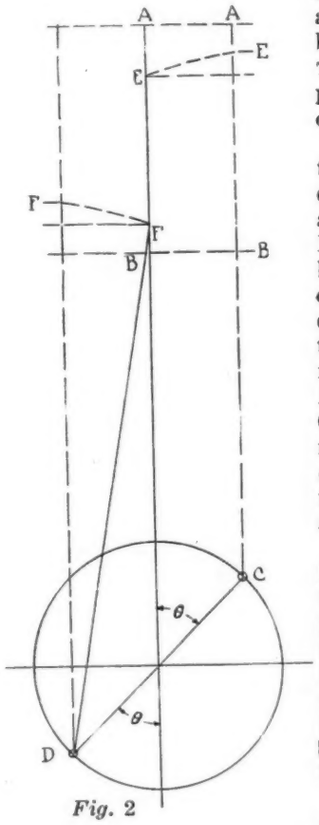


Fig. 2

The writer will endeavor to explain the constitutional defect of the four-cylinder, and the remedy therefor. From first principles it will be found that if a crank-connecting-rod diagram be drawn as shown in Fig. 1, the distance moved from the right end of the stroke by *F* for a given crank angle θ is less than the distance moved from the left-hand end of the stroke, *i.e.*, *AE*, for the same corresponding crank angle.

As it stands diagrammatically, the result is obvious. On the other hand, so many people are unable to even realize it, let alone explain its obviousness, that it may be worth amplifying a little for the sake of the good English Professor Perry's "weaker brethren."

Considering the motion of the point *E* as under the influence of crank *OC* and connecting rod *EC*, it will be seen that the effect of *OC* rotating clockwise is to cause *E* to move to the right. What is not so easily seen is that *CE* is acting as a crank, also causing *E* to move to the right. Thus, if the line of stroke were moved up to the level of *C*, *E* would return toward its origin due to the

crank effect of *CE* being neutralized. Fig. 2. The crank effects of *OC* and *CE* are therefore combined and added together.

Regarding the matter now from the point of view of what happens to *F* moving to the left under the influence of *OD* and *DF*, it will be seen that again *F* is moving to the left due to the crank *OD* and connecting rod *DF*, but in this case the effect of the cranklike action of *DF* about *F* is to retard the progress of *F* to the left. Thus, if the line of stroke is dropped to the level of *D* it will be seen that *F* would be still further displaced to the left. So the crank effects of *OD* and *DF* are combined, but in this case the lesser is subtracted from the greater.

For students reading this article there is nothing more instructive than to make a small paper model of the linkage described, with varying ratios of crank to connecting rod, and actually measure and tabulate the crank displacements for various crank angles and the differences for the same angle according to whether it is from the top or bottom of the stroke.

The understanding of this simple proposition is essential to the intelligent handling of engine balancing problems in general.

Having shown therefore that the piston moves further down the stroke for a given crank displacement from the top than it moves upward for the same crank displacement from the bottom, it is clear that these movements take place in the same time if the crankshaft is rotating at a uniform angular velocity.

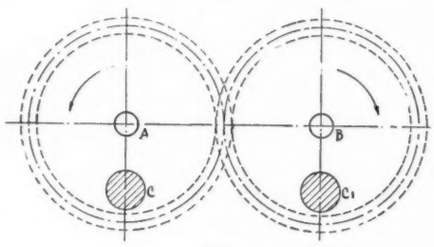


Fig. 3

A difference in distance traveled in a given time is obviously a difference in speed, and a difference in speed at the end of a given time for bodies starting from rest means a difference in acceleration, and a difference in acceleration means, for a moving part possessing mass, a difference in force applied to cause its motion.

Therefore, the fact that a piston moves farther down the stroke for a given crank displacement than it does up the stroke for the same crank displacement, means that the force required to cause this movement is greater at the top than at the bottom of the stroke.

In a four-cylinder engine there are with the orthodox crank setting two cranks up and two cranks down at the ends of the stroke.

It follows that in the case of the two pistons which are up these are causing greater forces to be applied than the two which are down, and that as the crank revolves this difference dies away and then grows again till the two cranks which were previously down are up and the condition of inequality of force applied is repeated. It is to be noted that the inequality arises once every stroke or twice per revolution. The function of the Lanchester anti-vibrator is to correct this inequality.

Having explained in an elementary fashion the nature of the case, in language which demands an apology to many readers, it is necessary to investigate quantitively the factors involved and the magnitude of the effect described.

Like all inertia effects depending upon speeds of rotation, the magnitude of the secondary inertia forces, as they are termed, varies as the square of the number of crankshaft revolutions.

But the factor which distinguishes the secondary inertia forces from the primary inertia forces is that they depend upon the ratio of the length of the crank to that of the connecting rod. Thus, if the primary inertia force (*i.e.*, that arising from piston acceleration if the crankshaft were so long that no disturbance arose from connecting rod angularity) is represented at any speed by unity, the secondary unbalanced force will be r/l, where r is the crank radius and l the length of the connecting rod so that the effect of the connecting rod angularity is to increase the primary inertia force at the top of the stroke by the fraction r/l and to decrease it at the bottom by the same fraction.

In a four-cylinder engine with connecting rod length equal to four times the crank throw, since $r/l = 4$, the total secondary inertia force is precisely the same as the primary inertia force on one cylinder. Its magnitude at speeds of, say, 2000 r.p.m. may easily amount, in moderate-sized engines, to about 1000 lb., and this force is applied 4000 times per minute, as it occurs twice per revolution.

The effect is two-fold. In the first place, owing to its more or less elastic support, the engine vibrates, and, in the second, these vibrations at certain speeds synchronize with the periodicity of the chassis or body and cause periodic effects which are annoying and sometimes disastrous.

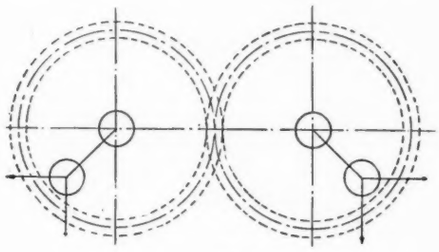


Fig. 4

The chief virtue of the six-cylinder engine is that the secondary inertia forces are canceled out by the disposition of the cranks, so far as the engine as a whole is concerned.

The function of the Lanchester anti-vibrator is to provide a means for cancelling out the secondary inertia forces in four and eight-cylinder engines, thus correcting the chief constitutional defect in such engines.

To this end two reverse rotating balance weights are employed, each of which supplies a component sufficient to quench one-half of the unbalanced secondary inertia force.

It will be seen that as these balance weights are geared together and are rotating in opposite directions, in its four-cylinder application all the horizontal components of the centrifugal forces set up are balanced and only the vertical component remains.

The magnitude of these is precisely equivalent to the secondary inertia force at all points of the piston stroke, to the extent of the first two terms of a Fourier series, beyond which it is unnecessary to go even for "ideal" practical requirements.

Fig. 3 indicates the nature of the motion.

A and *B* rotate at twice engine speed so that counterweights *CC* are always in the lowest position when either pistons 1 and 4 or 2 and 3 are at the top of the stroke.

Intermediate positions are indicated in Fig. 4.

The vertical components of the forces set up by the counterweights balance the piston inertia, while the horizontal components are themselves self-contained.

In the case of eight-cylinder engines, where the effect of secondary unbalanced forces is more marked than in four cylinders, the same principle can be applied, but in this case the balance weights must exert their forces horizontally as shown in Fig. 5.

The device is one of beautiful simplicity. The energy of the reverse rotating balance weights is constant at any

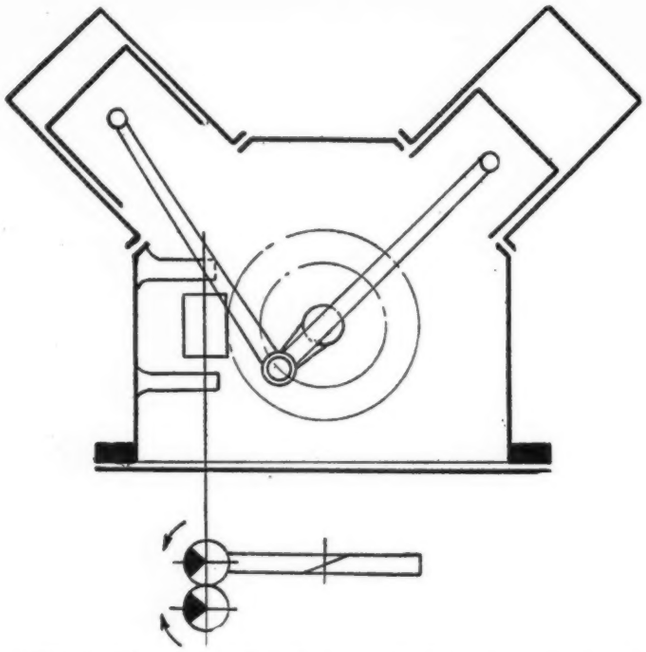


Fig. 5—Diagram of Lanchester anti-vibrator as arranged for 8-cylinder engine

given engine speed, so that no energy is absorbed or given out by the balance weights. The only forces which have to be applied to drive the device are those necessary to overcome the friction of the spindles in their bearings, which is exceedingly small. There is for the same reason no reversal of forces, so that quite considerable back lash can be tolerated in the driving gears.

Owing to the considerable inertia of the rotating masses, the teeth of the gears do not tend to wear out of the shape required to transmit uniform angular velocity so that the device is essentially silent in working. This argument relates to the condition of constant engine speed and naturally does not apply when rapid changes in engine speed are made.

The writer has had an extended experience with the Lanchester anti-vibrator and can testify that the difference made in the running of a four-cylinder engine is remarkable. Under ordinary conditions of use it becomes indistinguishable from a six-cylinder and emphasizes the really small difference in the "pick-up" between the four-cylinder and the six-cylinder.

The application of the device to a four-cylinder engine is shown in Fig. 6. It will be seen that it is capable of being applied with little if any structural alteration.

In the writer's opinion, the Lanchester anti-vibrator is the economic solution of the engine problem on cheap and moderate price cars, from the point of view of manufacturing cost only. It will, for other reasons, have its bearing on the development of the higher priced cars, in which considerations of expense are secondary in importance to those of efficiency.

It is peculiarly suitable for application to truck engines. Such engines are usually built with heavy pistons and connecting rods, and often attain quite high speeds and in general are subject to pronounced vibration. This vibration has a devastating effect upon the reliability of gasoline pipes, oil pipes, control connections and the multitudinous parts of engines and auxiliaries which will come slack if given half a chance. The Lanchester anti-vibrator, by making the engine run perfectly steadily, goes a long way toward avoiding these troubles and thus reducing up keep costs.

It may be thought from the above that the effect of the anti-vibrator is to negative the value of light reciprocating parts. This is emphatically not the case. As pointed out, vibration occurs not only by reason of the magnitude of the secondary inertia forces, but also due to these synchronizing with the supports of the engine and parts of the chassis generally, such as clutch and brake pedals, steering column, etc. In addition, the virtues of light reciprocating parts in respect of the mechanical efficiency of the engine are so great that they must not be overlooked. To obtain the most perfect running in a four or eight-cylinder engine both light reciprocating parts and secondary balancing are essential.

DURING last year the factory which started in February, 1918, at Durban, Natal, to produce an alcoholic motor spirit manufactured 255,158 gal. of the fuel and exported over 4000 gal.

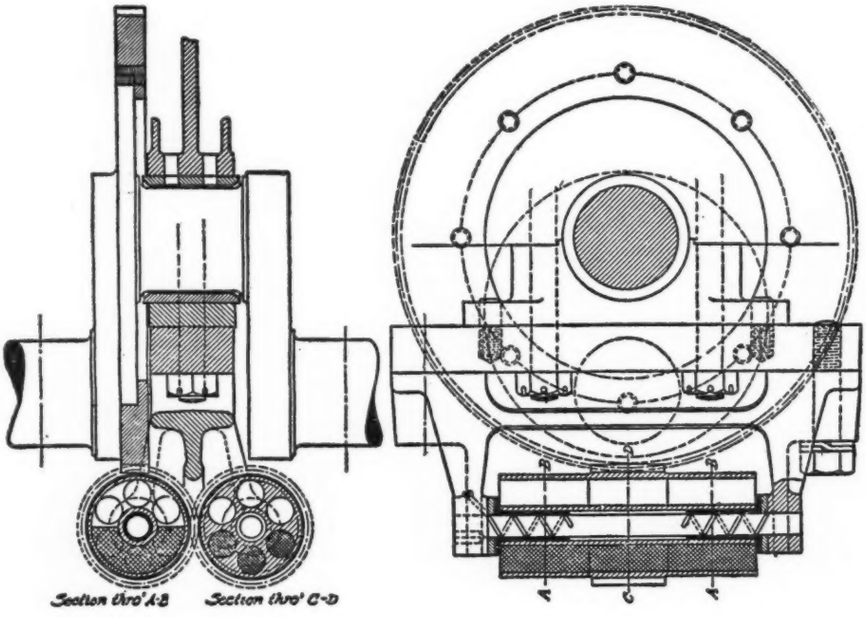


Fig. 6—Two sectional views of the Lanchester anti-vibrator. (From The Gasoline Automobile, Vol. I, by P. M. Heldt.)

Accessibility and Sturdiness Feature New Line of Axles

Many of the lessons of the war are said to be incorporated in this line of axles, the post-war designs of the Stan-Par line, in which both front and rear axles for passenger cars and trucks are included. While striving for lightness and accessibility, the designers have not sacrificed sturdiness of the product.

REVISED designs, incorporating engineering advancements, some of which are due to war experience, have been expected from the parts makers in the automotive field since the movement for peace began. These new and improved lines of parts for assembled cars are now coming to attention.

An interesting line of axles, incorporating features of improvement, has been brought out under the Stan-Par trade name and is in production. It includes front and rear axles for trucks, passenger cars and trailers, the latter being made in both dead axle and for four-wheel steer types. Much of the new engineering development has been learned through experience in Q. M. C. and ordnance work during the recent war. Ease of adjustment, accessibility, and sturdiness without undue weight are some of the outstanding features.

In the passenger car axles, probably the most noteworthy point is the use of a bearing support on both sides of the pinion, simple exterior adjustments for the pinion shaft and easy adjustment. Accessibility and better distribution of load and thrust in the rear wheel bearings are also characteristics. The passenger car axles are made in pairs, front and rear, and are of four capacities, as follows: 2000 to 2500 lb., known as Model 2050F, for the front, and 2050R, for the rear, and 2500 to 3000 lb., known, respectively, as 2550F and 2550R; 3000 to 3700 known as 3070F and R, and 3700 to 4500, known as 3780F and R. These are supplied in gear ratios between 3.75 to 1 and 5 to 1 in steps of 0.25 to 1.

Bock Bearings Employed

By using semi-floating construction with two opposed Bock bearings at the outer end, each of the axle shafts has been rendered independent of the other as regards end thrust. Bock bearings, a Stan-Par product, are used throughout these axles. These axles are particularly designed for Hotchkiss drive, having a sufficient factor of safety to transmit the torque necessary to slip the tires on dry pavements. The use of rectangular cross-sections at the outer end of the rear axle housing has been avoided, as it has been found that housings of that type split at the weld. The housings on the Stan-Par line are now of circular cross-section and the torque, due to Hotchkiss drive, passes through the outer ends of the housing to the flange integral with the housing, and from this through the rivets to the stamped spring perch.

The section shown here shows Model 2050R, with a capacity of 2000 to 2500 lb. The features noted on this axle are common to the larger sizes also, except that the parts are made heavier. On the Model 2050R, the smallest of the four passenger car rear axles, the tire load capacity is 2050 lb. The track is 56 in.; spring centers with 2-in. springs, 42 in. maximum and 38 in. minimum.

The ground clearance is:

31-in. wheels,	9	in.
32-in. wheels,	9½	in.
33-in. wheels,	10	in.

The overall width is 63⅜ in. The brake equipment is an internal shoe cam operated, and an external semi-wrap design with a 12-in. drum diameter and 1¾ in. brake face width.

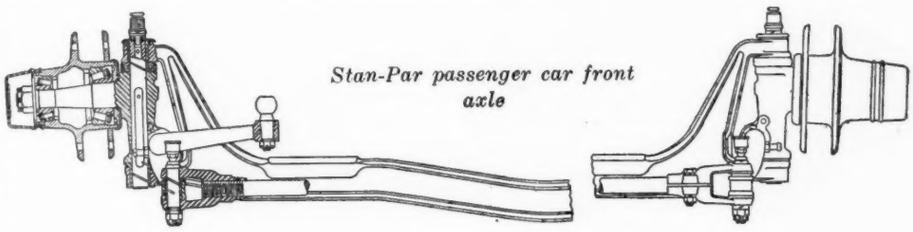
Driving Pinion With Right-Hand Spirals

The driving pinion is cut with a right-hand spiral so that its normal forward driving thrust is taken on the large Bock bearing at the front end of the assembly. The large size bearing is used here so as to take this spiral thrust and also to carry the weight of the rear universal joint and the propeller shaft.

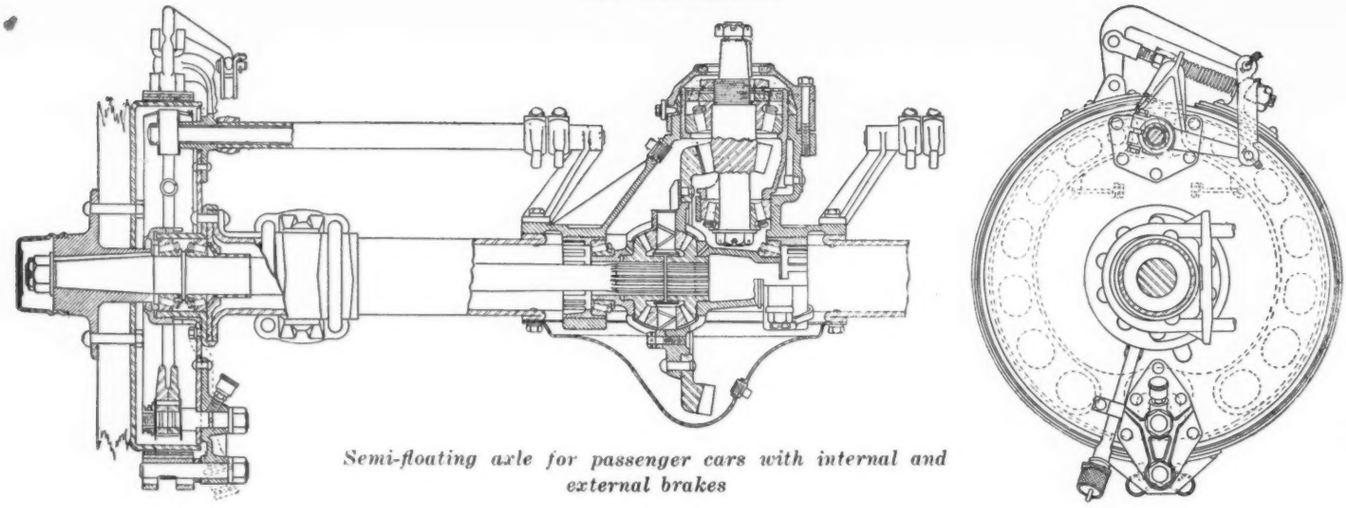
One of the fundamental advantages of mounting the pinion between two bearings is the fact that both pinion shaft bearings receive a supply of lubricant without the use of a grease cup.

Adjustment of the pinion has been simplified by cutting a thread on the outer end of the pinion shaft carrier and mounting upon it a conical faced ring. This ring seats against an internal conical facing in the rear axle housing cap. The location of the pinion is determined by the position of this ring on the threaded portion of the carrier, as the inner end of the ring abuts against the housing. After the adjustment is made the cap retaining bolts are drawn up tightly. Adjustment of the bearing is by nut and locknut.

Some new developments have been made use of in the gears for the passenger car rear axles. It was desired to maintain maximum road clearance when producing axles of low gear ratios, these ratios running as low as 5 1/7 to 1. In laying out the gears it was possible to vary the diametral pitch, the pressure angle, the relative thickness on



Stan-Par passenger car front axle

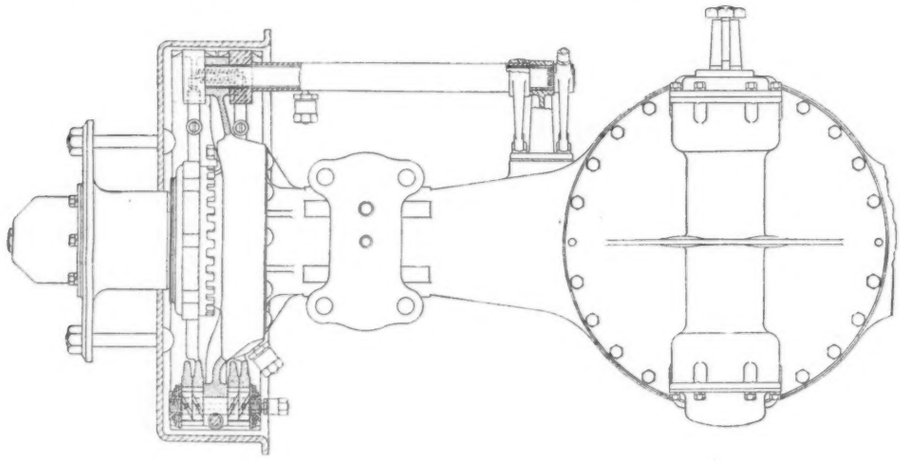


Semi-floating axle for passenger cars with internal and external brakes

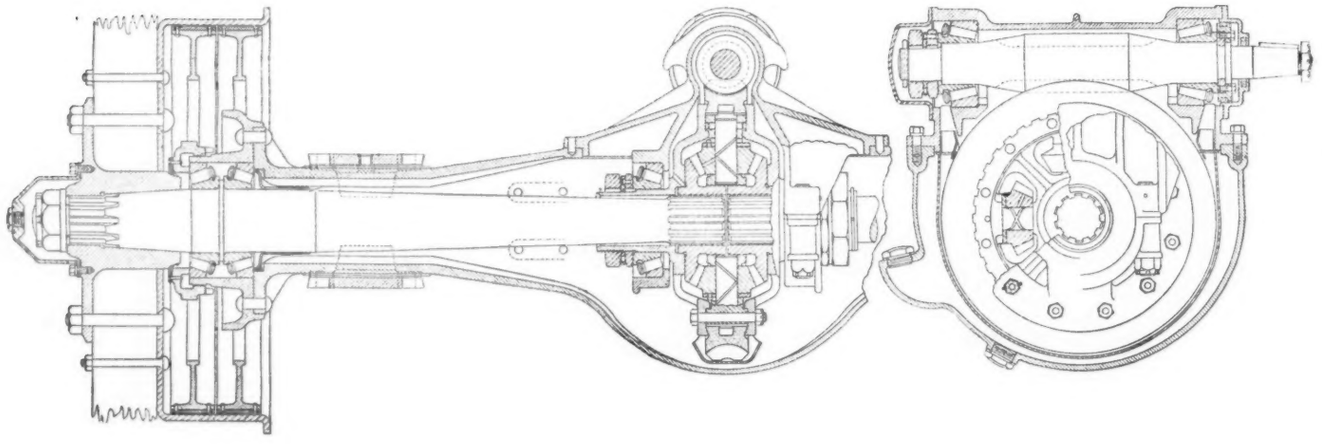
the pitch line of the teeth of the pinion and gear, the relative length of addendum on pinion and gear, etc., in order to strengthen the pinion tooth, which is normally much weaker than the gear tooth.

The bevel ring gear is circumferentially riveted to the differential housing. While this necessitates an offset axle requiring one shaft to be shorter than the other, it makes a very good assembly proposition and also simplifies the ring gear forgings. The differential is a four-pinion, bevel type, with the inner ends of the axle shaft splined into the differential gear. The ring gear and differential assembly are mounted on a set of Bock bearings, which takes both thrust and radial load. Adjustment of these bearings and of the bevel ring gear is made by taking up either way on the threaded cages into which the cup is pressed, which are mounted in the differential housing.

At the outer end the axle housing is flanged and riveted to the disk, which supports the bearing and stationary brake mechanism. The rear wheel is mounted on a pair of bearings inside the hub, in accordance with common semi-floating practice, the hub being a fixed type and bolted to the rear wheel spokes, the same bolts acting as a support for the brake drum. A collar or flange is thrown up on the axle shaft to take the end thrust which it transmits through the Bock bearing to the housing. As a precaution against oil, there is a flange piece with tubular extension which extends in over the axle, and this is packed to prevent oil passing through to the brake drum. There



Top view and section of truck rear axle with worm drive and designed for Hotchkiss drive



is also a packing in the cap which passes over the hub.

Some of the important materials and dimensions used in the construction are:

Material of hubs—malleable iron.

Material of hub caps—pressed steel.

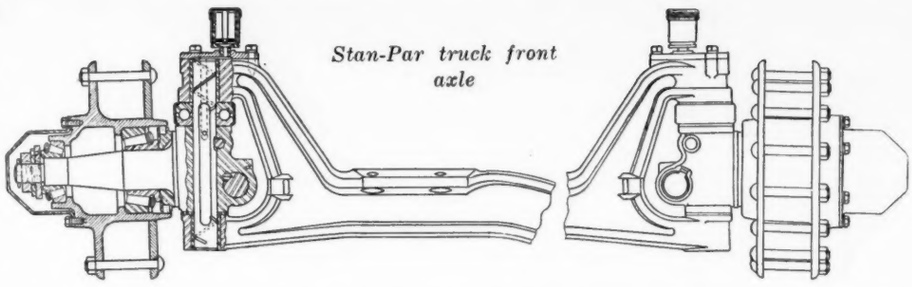
Material of housings—pressed steel, welded.

10 splines, 1¼ in. S. A. E. standard.

Material of pinion drive shaft, 2315 S. A. E. steel.

Material of ring gears, 1020 S. A. E. steel.

Material of axle shafts, 2335 S. A. E. steel.



Stan-Par truck front axle

The front axle, which pairs with the rear axle just described, has a load capacity of 1290 lb., with maximum spring centers, and of 1200 lb. with minimum spring centers, these dimensions being respectively 28½ and 26½ in., with 2 in. springs. There is no drop in this axle at its center. It is a straight Elliott I-beam forging with a depth of 2¼ in. between the spring centers. The top and bottom flanges of the I are 1 7/16 in. in width and the thickness of the web is 7/32 in.

Truck Axles

The Stan-Par truck axles are made in pairs, front and rear, and range in capacity from ¾ to 1 ton up to 5 and 6 ton. The models are divided as follows: ¾ to 1 ton; 1 to 1½ ton; 2 to 2½ ton; 3 to 3½ ton and 5 to 6 ton. The fundamentals of design are similar in all these axles, the only variations being in their dimensions, and the gear ratios available for each of these models vary in accordance with practice for trucks of that capacity.

All the axles are the overhead worm type with center line differentials. Either the bevel gear or Elbertz differential is supplied in these axles. The worm is mounted on two Bock bearings within the worm housing which bolts on the top of the differential casing. Adjustment of the worm bearing is made by the usual nut and lock-nut arrangement, this adjustment being accessible by removing a cap from the rear end of the worm housing. The worm wheel is anchored between the two halves of the differential housing by a dovetail section, which fits into a corresponding section of the split differential housing. This housing is carried on bearings. The axle shafts are splined at the differential ends and are of tapered sections for uniform strength. At the wheel end the axle shafts are carried on two sets of bearings, the thrust being transmitted to these bearings by means of an integral collar on the axle shaft.

Special arrangements have been provided for lubricating the worm and worm wheel and the bearings, the wheel and worm being utilized as a pump for lifting oil to the point requiring copious lubrication.

Oil leakage is prevented by a pressed steel collar, which fits on the shaft and is flanged at the bearing, and a packing between the collar and axle housing. This collar is grooved where it is in contact with the axle shaft.

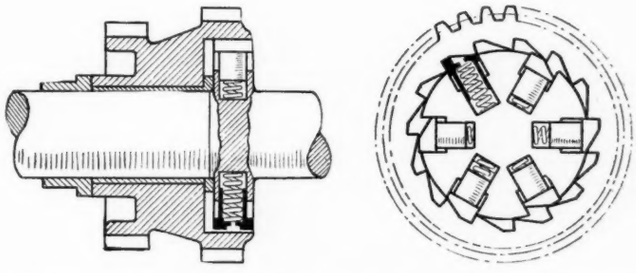
The brakes are mounted side by side on a common drum, the drum being bolted to the hub through the spokes and also to the spokes. Both sets of brakes are external expanding. The principal dimensions and materials used in the rear axles are:

Hub—steel castings.
Hub caps—pressed steel.
Housings—pressed steel, welded—and steel castings.
10 splines, S. A. E. standard.
Worm shaft—chrome nickel steel.
Worm gear—alloy bronze.
Axle shaft—2335 S. A. E. steel.

One-Way Clutch in New Pierce Transmission

ONE of the improvements in the Pierce-Arrow, recently announced, is a change in the design of the transmission whereby the engagement of the intermediate speeds is facilitated. If the driver wants to change from direct drive to third speed, and to that end depresses his clutch pedal, the countershaft will keep on running for some time at approximately the same speed, owing to the inertia of the clutch cone, and the tailshaft of the transmission also will keep on running at about the same speed, if the car is proceeding on a level road, owing to the momentum of the car. This means that immediately the friction clutch is withdrawn and the direct drive clutch disengaged, the pitch line velocity of the third speed gear on the splined shaft is about 50 per cent greater than that of the third speed gear on the lay shaft, and the two cannot be meshed readily, even though the teeth are properly chamfered.

To overcome this difficulty, the Pierce designers have provided the gear on the layshaft with a one-way clutch consisting of six pawls mounted in recesses in the layshaft so as to be movable radially from the shaft axis. The pawls are equally spaced around the circumference and there are fifteen equally spaced ratchet teeth on the inside of the wheel rim, with which the pawls are forced into engagement by coiled springs behind them. Only three pawls can engage at a time, and the reason for providing six is to make the backlash smaller.



With this arrangement, if it is desired to engage the third gear when the car has been running on high, the gear on the layshaft will be running at lower pitch line velocity (left handedly, looked at from the front) than the gear on the splined shaft. The gear on the layshaft must therefore be speeded up when it is meshed with the gear on the splined shaft, and this can be easily done, since it is free to turn left-handed on its shaft. The only thing to oppose the speeding up of the layshaft gear is its own inertia, and this is comparatively very small.

The two intermediate gears on the layshaft form a single unit, which is bushed and turns free on the shaft, to which it is held by the pawls. Hence the one-way clutch acts when either of the intermediate gears is engaged.

Engineering Organization and Routine

This is an instructive and interesting story that makes for good production. In it, a practical engineer outlines a reasonable system whereby all concerned can be kept in touch with all of the work and the developments at all times. Also by this system there would be in the records an accurate history of all work and of the changes and the reason for them.

By George L. McCain*

ENGINEERING organization in all of its details is a subject for a good-sized book, if the question is to be thoroughly dealt with. There are so many small details of which even your co-worker in the production, purchasing, or finance department does not realize the importance, and which are sometimes not sufficiently studied by the engineers in charge. Once properly arranged, these details, plus an organization educated to carry them out, will never again bother an executive engineer, but if the plan has not in the beginning been thoroughly systematized and organized, continual trouble will result.

There are may plans whereby engineering work may be properly and thoroughly carried out, and each one, necessarily, is chosen for particular conditions, no two of which could be alike. It is therefore the object of this paper to outline a system which can be used in most any branch of automotive engineering, particularly in that kind of work which requires certain divisions of responsibility and effort, such as the carriage chassis and body groups in an automobile factory.

Selection of Personnel

Choice of division engineers or group heads is the first important consideration, as they must at all times be the nucleus around which the engineering system is carried on. They must have had some experience as executives in engineering work to fit them as the heads of any group of men. It is assumed that they are technically and mechanically equipped to carry on the kind of work to which they have been assigned.

Next to this it is important that each know the particular division of work to which he is assigned, and be properly instructed so that his relations with other group engineers will insure the best possible working arrangement. This latter point is sometimes overlooked, with the result that two or more division engineers are literally thrown together without instructions as to method of working or personal qualifications.

Even the assistants of the division engineers, if any, should be educated in, and practice, these principles, as they are extremely important in all large organizations.

The chief draftsman should have the same technical training and mechanical knowledge as the division engineer, as he must be ready at any time for the promotion to the position of engineer. He must be systematic at all times and must be in close touch with all details going on in the drafting room. His success will be measured, first, by his technical and mechanical ability, second, by his ability to get all men in charge to exert their best efforts for the work in hand. He must be ably seconded by an assistant, if the organization is large, and a competent checker, or checkers, as the case may be, who should oversee all the detail work as it progresses. The duties of the checker are described more in detail below.

The Checker

A good checker is very essential to engineering work, and the choice of such talent is too often underestimated. There are many who believe in paying the checker less than the designer or high-class draftsman, but this is in most cases a mistake, because the checker, if properly qualified, can save in every way, from his knowledge of drafting, tool making, manufacturing, and inspecting.

The checker is still more valuable if he has some experience in purchasing, or at least in knowing the metal and accessories market. He should know how to set manufacturing tolerances, and should study in detail every manufacturing operation on every detail part. Such men will demand good salaries, and will more than earn them in the savings they can make. Men for this work must have executive ability and they must be diplomats to be always successful, as they are to the draftsmen what the inspectors are to the shop workers, and can easily fail by improper treatment of men or work.

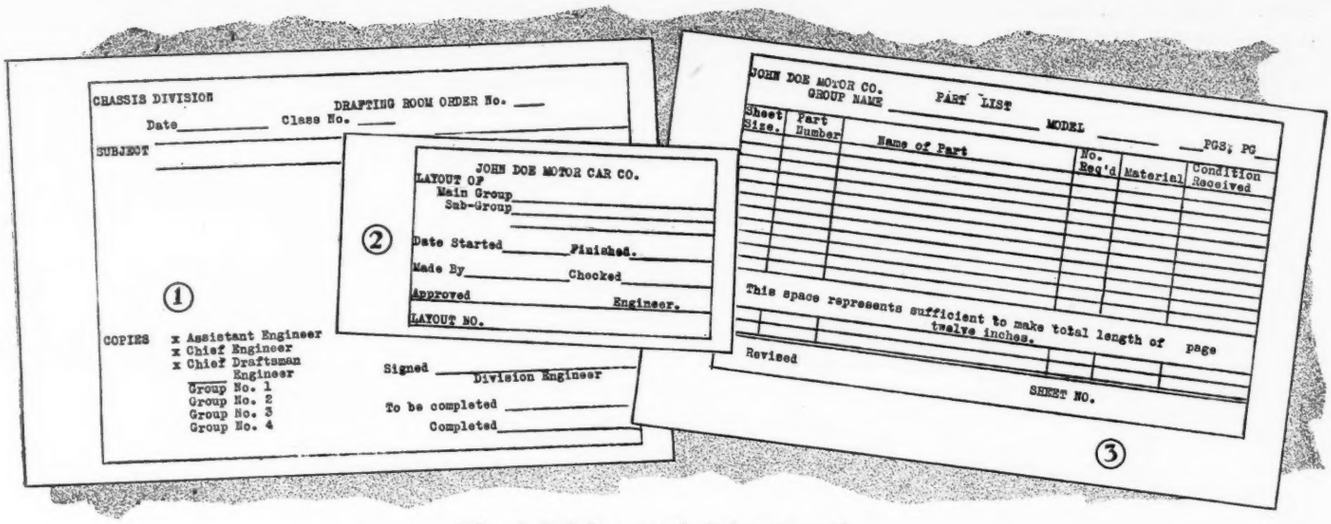
The Designer

The choice of designers and detailers is not so difficult, because their work is more specialized, and their personality has very little effect on the organization as a whole. Some care must, of course, be exercised to choose men who can work together, but the most important consideration is the ability to do design and drafting work, and, above all, that of being capable of writing an intelligent parts list in connection with the drafting.

Next in importance is the choice of clerks for the record keeping, blue printing, filing, etc. This is the most routine of any engineering work, and there are very few who can take charge of such a department and do all the necessary work thoroughly. The chief clerk should have a fair knowledge of drafting and engineering routine in general and should have executive ability sufficient to manage all clerks, stenographers, and other miscellaneous help necessary to a record division. As a rule the most important of the routine record work is best done by middle-aged men who have had other clerical or bookkeeping experience.

Much more might be said about choosing personalities for an efficient organization, but that is more directly connected with welfare or employment work. This department must certainly be consulted when engaging engineering help, even though the extent of their dealings be that

*Former chassis engineer Packard Motor Co., and engineer Lincoln Motor Co.



Figs. 1, 2, 3 *for records in layout work*

of obtaining the necessary records of previous employment, physical fitness, etc.

Division of Work

The work done by the personnel outlined can be divided into two sections—Design and Routine. The first can be defined as that process of development immediately preceding the final layout of the object to be produced by the manufacturing division. Routine is that process of evolution which transforms a design decision into permanent records of layouts, details, parts lists, part number records, blue print records, indexes, etc.

The object of this paper is to outline the Routine part of engineering which can be the same, regardless of ideals connected with the design, production, or marketing, of a product. The following is, therefore, upon the subject of Routine, and the system outlined is a slight modification and a combination of others now in use by various companies. Simplicity and uniformity are ideals to be attained and the forms presented are drawn up with that in view.

It is assumed that any manufacturing plant that keeps an engineering department of any size is continually improving its product, and at the end of a selling season, designing a new model. Because of this variation of the work, and because of the fact that records of decisions are always desirable, it is best to start all engineering work by a general order from the management.

This order lays down a general policy as well as giving the engineering division a definite work, which the sales department has already agreed would be the best product for them to market.

This order reaches the division engineer in most any shape, so long as it is intelligible and suitable for filing as a permanent record. He in turn must translate it into definite instructions for design work, and it is desirable that others in the engineering department know what detail instructions have been given so that all may be working toward the desired result. Fig. 1 is a sample order form, which should be the only authorized instruction for engineering work of any kind to be done in the division.

The DRAFTING ROOM ORDER No. is a serial number to be assigned by the issuing office and is only for convenience in filing. "Class No." refers to the relative importance of the work ordered. In a drafting room in which there is a variety of work there is always the question of precedence of one job over another, and this should always be decided by the division engineer. The system proposed is as follows:

Class No. 1 includes:
- Changes which affect production.
- New designs which will probably hold up production.
- Any other work which must be done without delay.

Class No. 2 includes:
- Changes which do not affect immediate production.
- Designs for experimental work which can not be put into the shop at once because of other work.

Class No. 3 includes:
- Changes which do not affect production.
- Changes made to correct records.
- New designs which can not be completed without long study.

Copies of the order should always be sent to the assistant engineer, chief engineer, and chief draftsman. A copy should sometimes be sent to some other division engineer, in which case the name should be filled in, and generally the drafting room group which is most interested in the job should also have a copy of the order. In this case an "x" should be placed before the name of the group to which it belongs. Upon the completion of the work called for on the order, the date must be filled in on the division engineer's copy. This may then be taken from an "IN WORK" file and placed in a "COMPLETED" file, if the volume of work warrants such a follow-up.

Layout Work

Original layouts are too often made hurriedly and never completed in all details. Such haste usually leads to interferences and troubles of other kinds, such as mistakes in writing parts lists, specifications for standard parts, and even specifications for materials. A few more days spent on a layout intended as a permanent record is always time saved in the end, because it avoids interferences, saves time for the detailers and checkers, and makes a much better record for future use. The naming of layouts, while seemingly trivial, is quite important.

Unless a layout is properly named, it is almost impossible to index it so that it can be found at a later date without trouble. If the name of the main group and then that of the sub-group is always used as the most prominent part of the title, indexing will be simple and trouble in recognizing a layout minimized.

For example, if the title is "Transmission, Reverse Gear," it is much more easily identified and indexed than if the name is "Reverse Gear for Transmission," or if the

title is "Rear Axle, Brakes," this is so much more definite than "Brakes—Rear Axle," and naturally falls into any indexing system much more easily. All layouts should be stamped uniformly, and the information called for "filled in," as a patent litigation is often dependent on the establishment of the dates of starting and finishing a layout.

The form Fig. 2 is easily used and includes all the necessary information as outlined above. The numbering of Fig. 2 layouts, the size of sheet on which they should be made, etc., will be taken up more in detail later on.

When a layout is completed, checked and approved, it is ready for detailing and parts-list writing. All detailing should be done carefully, following whatever regulations are adopted relative to the type of lettering, width of lines, cross hatchings, etc. It is almost universally agreed that the part numbering or piece numbering system is the most satisfactory for every purpose.

With this system it is necessary to have only one detail drawing on a sheet, and the sheet number is the part number. Each sheet for detailing should have certain blank spaces provided for Name, Part No., Material, and spaces for the signature and date for Detailer, Tracer, Checker, and Chief Draftsman. Each detail drawing should also have a space provided for recording changes; further details on this subject will be found under "Changes."

Part Lists

Part lists should be written in conjunction with the making and checking of the details. The drawings and part list should be checked together as a group or subgroup, and delivered as a whole for permanent records. Part lists can be written in many forms and in many ways, and sometimes contain a great deal of detail information more or less necessary. It is difficult to specify any exact form for a list and expect it to meet all conditions in all factories, because there are so many different ways of planning and routing the work. Some expect that the part list will serve as a list purely, while others might use it for assembling, purchasing, and planning tools or production.

After seeing the many combinations which can be made, I am free to recommend a very simple form, which is given in Fig. 3. It is to be printed on a 9 x 12-in. sheet, as this is quite popular as the base size for detail drawings. The use of this size sheet is convenient because it can be placed in the same file as other drawings and makes a convenient book to handle when bound together as a group, or as a complete model.

It is understood that in writing a part list certain groups shall be used, such as "Engine," "Transmission," "Rear Axle," and these groups of lists must include everything which is a functional part of each one. In the upper right-hand corner is a space for indicating the number of sheets in the group, and the location of the individual sheet. The last column is provided for specifying how a certain part is to be received by the manufacturer, whether in a semi-finished, finished, or rough state.

Space for revision notes is also important, as each sheet must always be preserved as an original record. The sheet number identifies the sheet in the files, for blue printing, and for all permanent records. Change routine as related to parts lists will be outlined later.

Duties of Checker

Careful checking of drawings is always important, even though it may seem sometimes a waste of time. No matter how well the designing and detailing is done, there are always points to be carefully investigated by the checker. There is quite often a question about the starting and ending of a checker's responsibility.

It is usually safe to assume that when a layout is completed by the designer, carefully checked by the chief draftsman, and approved by the division engineer, it is ready for all subsequent work, and it should be the authority for all the checker's work so far as the outline of the detail is concerned. The checker must therefore investigate materials, method of assembling, limits of tolerance in manufacturing, surface finish, checking of part lists, and in most cases should satisfy himself that the part can be easily and properly manufactured.

The checker can do harm to himself and the organization as a whole by improper methods of correcting of mistakes. At the best, he is unpopular with the men whose work he criticises, just because of the criticism, so that he is at once called upon to use considerable tact in getting their co-operation. Because of the fact that he is called upon to investigate so many questions hinging upon the making of parts, and because it is usually advisable to have as many of these questions settled as early as possible, he should be called into consultation on each group before it has gone too far, so that he may prevent mistakes that he otherwise might be called upon to have changed at a later date.

This practice prevents friction between detailers, designers, and checkers, and at the same time leads to a desired result more quickly. The advance work can also be extended to the tool designing and planning departments. The checker should be fairly well posted on the methods which will be followed after delivery of the drawings to the factory, so that he will not turn out work except in accord with the established practice.

The checker does the last of the engineering work, and after he is through with a group of drawings and part lists, he delivers them to the chief draftsman and the division engineer respectively. Their approval of all work must be more or less a matter of form, as they cannot take much time from their other duties to review the work of the checker. He must remain responsible, therefore, for the correctness (in detail) of all drawings issued.

His work is only checked by the shop in assembling the first car (or unit) and must stand as released until corrections or suggestions are received. The smallest suggestion that a mistake exists should be investigated thoroughly, and the necessary corrections made at any cost. Here again is another point of contact for the checker, and one which should not be overlooked.

Routine Work

When the division engineer delivers the original drawings, part lists, etc., to the record department, he starts a chain of routine which only stops when blue prints are formally delivered to all departments receiving them, and the drawings filed away for future reference.

Before going further into the question of routine, I would emphasize the necessity of properly numbering everything which is an original record. This includes drawings, part list sheets, layouts, details, sketches, instruction book sheets, specification sheets, and sketches which may at some time prove of value. This practice makes it easily possible to record all changes, and, best of all, enables the record department to absolutely control the issuance and return of blue prints. The proper circulation of blue prints should be controlled rigidly, as it is very easy to waste effort and money if loosely handled.

Record Department

When drawings are delivered to the record department there should be some written instructions accompanying them, describing the reasons for delivering, to whom blue prints are to be delivered, and describing, in some cases, the special disposition of drawings or blue prints. A

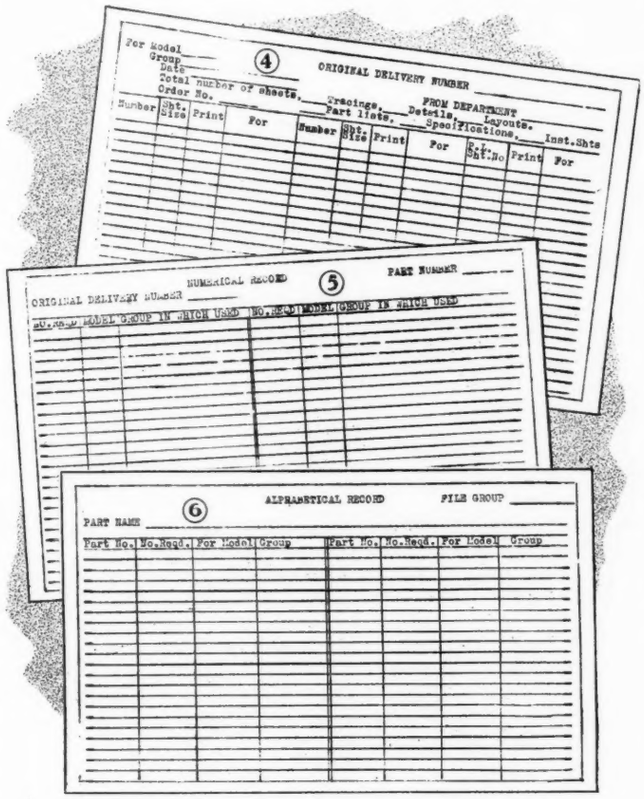
form can be used for this purpose, and, when numbered serially, makes a very useful and convenient record. This form I have chosen to call an "Original Delivery." Fig. 4, as well as all other forms outlined in this paper, is either 5 x 8 in. or 10 x 8 in., as necessity demands.

The delivery might come from any one of several division engineers, so that a space is provided for specifying the issuing department, directly beneath the serial number. Each department should have its own set of serial numbers for the original deliveries. The order number refers to the order issued by the division engineer, and forms a convenient means of tracing the origin of any work. Blue prints can be specified for a department or a person, or reference may be made to a predetermined schedule of delivery.

For instance, "Schedule 1" might mean every department; "Schedule 2," Engineering and Manufacturing, etc. The latter method is more systematic and would lead to less mistakes than the former. The former is recommended for experimental work only.

The record department, upon receipt of the drawings and original delivery, makes the necessary blue prints as scheduled, delivers them, and files the tracings, etc., belonging to that delivery. The delivery slip is then used for making permanent records. Two sets of stiff cards, 5 x 8 in., are prepared, one for the numerical, and the other for the alphabetical records, and a third, on the same size card, for blue print records. These three sets of cards form all that is necessary as drawing records, and the keeping of these files up to date is as simple as it is important.

The numerical cards, Fig. 5, are intended to record the use, by model and group, of every part designed by the engineering department. Often a part is used on several models and in different functional capacities, and the more models involved the more valuable the numerical record becomes. Reference to the original delivery is desirable because it reveals the source of information, date of delivery, etc.



Figs. 4, 5 *and* 6. *Forms for the record department*

There are a great many parts, besides standard parts, which can be used on several groups under different functional names. These cards keep an accurate summary of this practice for all models. The total number required of any part is often needed by the purchasing department, and this takes care of their needs. This also forms the basis for tool and production planning, and can be utilized by the stock department to good advantage.

Alphabetical records, Fig. 6, insure two things of great importance, first, uniformity in nomenclature; second, complete summaries of all parts having the same functional names. Before going further into the question of records, it will be of benefit to discuss that of nomenclature, because the record question is so dependent upon its uniformity. There are two methods of naming parts and I shall designate them as the Group and the Individual systems. The first is that recommended for adoption by the S. A. E. and names a part by the function it is designed to perform or connect with. The second names a part as an object, with a description of its use appended.

For example, under the first system we would have a "Connecting Rod Bolt," while with the second, the same part would be "Bolt—for Connecting Rod," or "Transmission Shaft Ball Bearing," as against "Ball Bearing—for Transmission Shaft." The first system is recommended as being simpler and much better adapted to uniform record keeping.

An alphabetical card file under this system becomes, at the same time, a group list of major parts, and a summary of all parts performing the same functions. It also avoids any duplication of parts as the engineering work progresses from year to year. For example, every piston pin ever used would be entered on the card of that name, and when a new number is requested for a piston pin, it is easy to determine whether a part previously designed and made can be used with the new design.

This is avoiding duplication and insuring uniformity, as parts having exactly the same functions to perform will be named the same from one model to the next. If a new part, having a slightly different function, is necessary, the chief record clerk, or a committee, should be asked to approve the new name, which should be chosen to conform with other names in the group to which it belongs. The alphabetical and numerical cards must be written up at the same time from the Original Delivery, in order that no numbers be omitted from either set of records.

Records of blue prints delivered, Fig. 7, are important as a permanent record and as a follow-up in case of changes, reissue, etc. It is so easy to make a blue print and send it to the department requiring it, and at the time neglect to make proper records, that it is well to warn against neglect of this detail. It is comparatively easy to run a blue printing outfit, this being a matter of mechanical detail, but the handling of the prints should be studied with some care. Sorting of prints for delivery in a systematic manner is important as related to delivery and records, as prints are often misplaced, intentionally or unintentionally, and loss of time is the result.

Order blanks for blue prints are comparatively unimportant, most any size and shape sufficing, so that the blue printing clerks may understand and file them for the daily record.

Ordering Blue Prints

Because blue prints are sometimes wanted in a great hurry, and at other times as soon as convenient, it is desirable to have different classes of orders for the variations of the work. An order printed on red paper could be

given the preference at all times, one on white paper the second choice, and on blue paper the third choice. This system would route the work so that important prints would not be delayed, and at the same time helps to systematize the work of printing. The record card for prints should be filed under the part number, and should contain the Original Delivery number, and records of quantity delivered, and to whom, the date ordered and the date delivered.

There should also be a space for indicating whether delivery has been made of new prints because of revisions. If the "Schedule No." as suggested under "Original Deliveries" is used, this also should appear on the record card. Receipts for all blue prints should be demanded and filed in the record department and the date shown thereon entered in the column "Date Received."

Part List Records

Part List records should be substantially the same as Part Number records. Each sheet has the same status as a drawing and is subject to the same blue print restrictions as a drawing. The same cards can be used for numerical and blue print records as are used for drawings. In place of the alphabetical record used for Parts Numbers, a book record should be kept which includes the following:

List of Part Lists by groups, that is, including every list ever issued on a given group, such as the Transmission. The use of this list makes it possible to locate every Part List of every Transmission ever designed or made.

List of Part Lists by models and groups. This should prove the most valuable of any, as it is an index to past and current models as well as experimental work. It must, to be of value, be kept up to date, as new sheets supersede old ones, as an experimental job becomes standardized for production, or as groups are revised, and should be arranged so that any group or groups may be located with the least possible effort. This list is the key to all engineering records, and one should be issued for each division engineer and chief draftsman who has occasion to use part lists for reference.

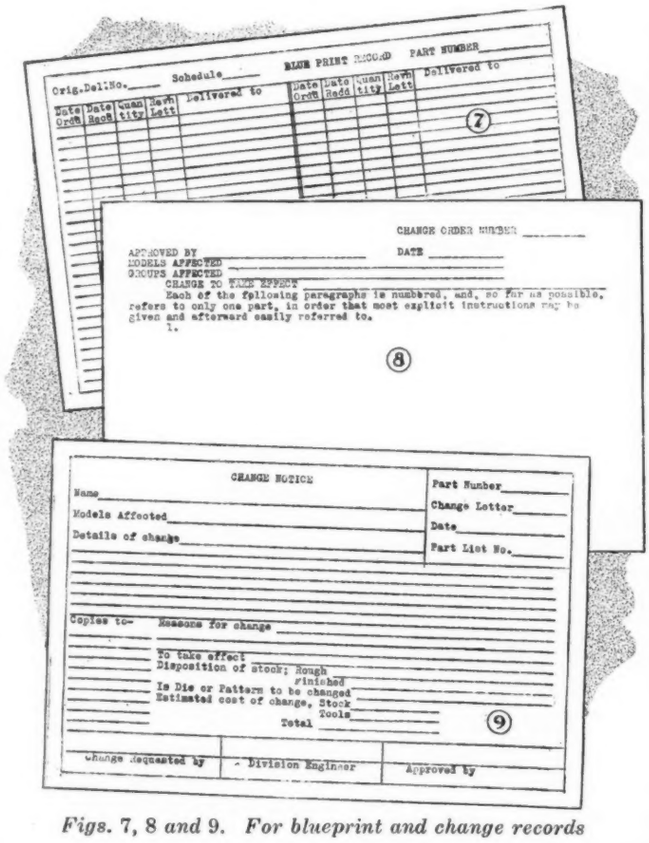
The sheets should be numbered in a regular series, and the number completely identifies the sheet. For example, a sheet may be number P-20, and be page No. 3 in a group of ten pages, and although so completely revised as to lose its identity, it will still be the third page of the group of ten, but will have a new sheet number, perhaps P-46. Such changes necessitate changes in the index, in order that the old sheets would never be used again.

Change Routine

Change routine is a subject which the manufacturing department is as vitally interested in as the engineering department, and in all cases the two departments should cooperate to obtain the simplest and best records. Any change involving cost or delay in manufacturing should be authorized by the division engineer, and in some cases by the chief engineer, and even in extreme cases by a representative of the manufacturing department. An order for such a change should be written and issued by the division engineer responsible, and such orders should be on simple forms, numbered serially and filed for future reference. Fig. 8 is a suggested form for such an order.

The change order blank, Fig. 8, should be printed on both 5 x 8-in. and 8 x 10-in. sizes, in order that the larger sheet may be available when making extensive changes. The change order number is for filing and for reference on the detail alteration sheet, description of which will follow. The reasons for the change or changes should be given very plainly on the above order, with sufficient explanation to clear up any future doubt as to the conditions leading up to the changes.

A change notice, Fig. 9, should contain the reasons for and all the details of a change, the effect on dies or patterns, instructions for putting into effect, disposition of stock affected by the change, and in some cases it is desirable to have the estimated cost of the change recorded.



Figs. 7, 8 *and* 9. *For blueprint and change records*

The change notice has no other number except the part number. This, together with the change letter and date, completely identifies the change and locates it in the file. The change letter is the same as that which appears on the drawing and refers to a change of dimension or shape. It often happens that changes follow each other on the same dimension or location, and in such cases the same letter is used with a different date. In case the change is on a part list, the same routine is followed, except that the Part List number is filled in in the space provided.

The above system insures at all times a complete history of the changes on every part, because all notices will be filed under the same number and the letters arranged in alphabetical order. Place is provided for the disposition of the various copies of the notice, so that they may be recalled if desired. This space may be used for specifying various department heads, or a set schedule may be followed, as necessity would dictate.

The best numbering system to be used for engineering and manufacturing is, of course, a question for each individual manufacturer to decide, because of varying conditions, but in general the best system, and the one most generally used at the present time, is that in which the part number is the drawing number on which it is detailed. No groups are used, and numbers are assigned as needed, regardless of the design group into which it falls. A system to be complete must provide for numbering details, assembly drawings, layouts, part lists, and miscellaneous other drawings and records of sufficient value for filing or blue printing.

Standard parts usually require some special series of numbers so that they may be segregated and easily identified. The following outline is proposed as one which will take care of the usual records of an engineering department:

Standard Parts Numbers 1 to 9999 inclusive.

Details of single parts 10,000 up.

Assemblies for shop use which represent a unit as handled between departments of a factory are numbered in the same series as the above, with the suffix "A" or "S" indicating "assembly."

Layouts L-1 up.

Parts Lists P-1 up.

Miscellaneous Drawings, such as tables, sketches, etc., M-1 up.

Each of the above series is independent of the others, and the prefix is suggested as a means of quickly identifying various kinds of records in the files. Other prefixes may be used for various purposes, the letter chosen being suggestive of the purpose for which it is used.

There are many other details of engineering and records which have not been touched upon here, but it is believed that most if not all are dependent upon special conditions. These would in all cases be governed by the organization to meet the particular cases, so that the routine outlined above would in all instances be supplemented by the additional details to make a complete organization.

New Heavy Duty Upright Drill

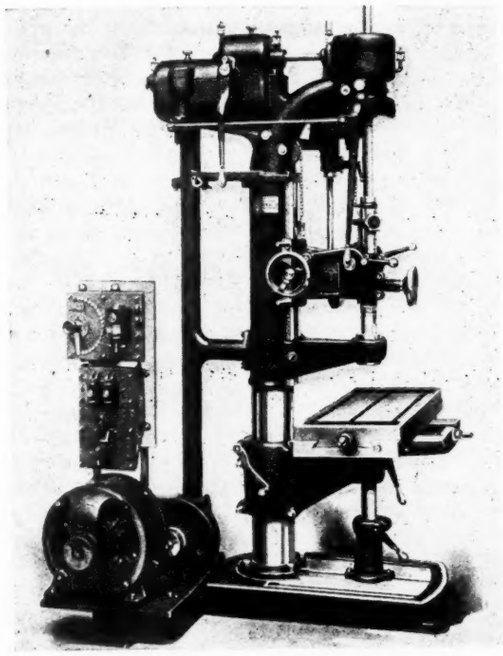
THIS new machine tool is similar in appearance to other modern upright drills, but its characteristics are quite different. It is one member of a new line of drilling and tapping machines recently placed on the market.

The base is surrounded by a channel draining into a large reservoir for the drilling compound, and is so designed that bolts may be entered from either end of the T slots. The table arm has a long bearing on the column and is internally ribbed for increased rigidity. The table may be raised and lowered from either side of the machine, may be swung around the column to clear the base for large work and cannot accidentally drop when unclamped.

The arrangement of the table T slots allows them to terminate very close to the center, allows heavy ribs to run directly toward the hub, permits work of any shape to be securely clamped, and prevents bolts from flying out should they become loosened while drilling.

The spindle head is raised and lowered by a handwheel and is perfectly counter-balanced. The spindle is provided with a depth gage and automatic trip which may be set to graduations in any position of travel. A safety trip at the limit of traverse prevents accidents. The spindle "quick return" is operated by one hand for sensitive drilling, for tapping, for rapid lowering or return of the spindle, with or without disengaging the power feed or the handwheel feed.

All power feeds are obtained by a single lever. The hand feed may be fed ahead of the power feed without disengaging the latter. This is particularly advantageous in starting large drills. A friction reverse tapping mechanism is embodied in the construction of all machines, and, being placed between the initial drive and the back gears, the power transmitted to the spindle is six times as great as in the spindle friction type.



New design of 25-in. drilling and tapping machine with motor drive

Bronze bushings are driven into bored holes, no babbitt metal being used in the machine. Ball bearings take the principal thrusts. The machine is driven by a constant speed belt through a gear box which furnishes the correct cutting speeds for drills ranging from 3/16 in. carbon to 2½ in. high speed steel, with slower speeds for heavy tapping and for boring up to 5 in. diameter. Constant or variable speed motors may be supplied even after a belt-driven machine is installed, as all styles of drive are interchangeable.

This drill is manufactured by the Fosdick Machine Tool Co.

Export Duty on Netherland East Indian Rubber

THE *Persbureau Vaz Dias* of Amsterdam, Holland, reports that plans are being made to levy a tax of 10 to 15 cents Dutch currency (4 to 6 cents U. S. currency) per pound on crude rubber shipped from the East Indies.

Protests have been made by the Internationale Vereeniging voor de Rubberkultuur (International Society for Rubber Culture) at The Hague, representing nearly all the Netherland East Indian plantations, and also by de Amsterdamsche Vereeniging voor den Rubber Handel (Amsterdam Society for the Rubber Trade), which is made up of dealers, brokers and plantations.

Fear is expressed that higher prices, which necessarily must follow the adoption of the proposed plan, would prevent competition with the Netherland East Indian rubber in the world market. While an export duty might not result in profit to the older plantations, it would without doubt adversely affect the younger ones.—*India Rubber World.*

Electrical Auxiliary Devices for Starting Systems

Of course you have had trouble with fuses. Mr. Hoffman, in this article, is looking forward to the day when cutout switches will replace the fuses and no matter how slight may be the variation of current in the automotive starting and lighting system, a switch will operate accurately and effectively. This will eliminate one of the less favored tasks with the engine.

By Fred J. Hoffman

APART from the dynamo, storage battery and the lamps there are still two very important elements needed in order to insure a thorough success of an electric lighting and charging installation.

On the one hand, automatic means must be provided for connecting and disconnecting the current generating source from the current storing battery when the critical points of maximum and minimum values have been attained and, on the other hand, devices provided to safeguard the proper working condition of the supply or wiring portion.

The designs for the former requirements have been developed on quite a number of principles; they are based on purely electrical action, controlled by the current itself passing through electromagnets that actuate the necessary contact-making levers; also on combination or semi-electrical arrangements which take the form of centrifugal, power-operated switching gears, and on mechanical constructions that employ an independent driving medium so designed as to engage the power plant in one direction of rotation and disengage when the speed for the generator would be too slow to give any useful output.

The devices for the safety of the wiring arrangement are based—with one exception—on the fuse blowing idea. A plant employing fuses is certainly cheaper and therefore more extensive in use, but the interruption of the circuit being obtained in this case by purely thermal action is not so reliable as plants embodying circuit breakers of a mechanical-electrical construction.

Criticism of Designs

The controversy between electrical and mechanical cutting-in and out relays on automobiles has been going on for quite a number of years, especially in England and France, where matters relating to automotive electricity are in the hands of a few firms.

Both designs, the electrical and mechanical-electrical, are open to criticism. The latter are apt to come into action when a heavier amount of current is passing through them than is the case with those that are actuated by virtue of the reduced rate of flow of that current itself, and hence the mechanical type of design requires greater care in its construction to guard against undue sparking and harmful burning away of the contact making points, whereas the electrical pattern may perhaps be a little more sensitive to external influences and to accuracy of adjustment, and doubtless more difficult to design in handy and small form than the mechanically operated, the marked advantage is in favor of the electrical apparatus in that they can be fixed in any convenient place upon the vehicle, irrespective of position of the dynamo, and so are able to work under better conditions, in addition to being more readily rendered accessible.

The function of the fuse and its employment as a means for disconnecting circuits through short circuits or overloads is pretty well known, but not so the electro-mechanical device which replaces it. These automatic circuit-interrupters or breakers are so arranged as to open the current when some prearranged maximum value is attained. They fulfil the action of a fuse, but much more efficiently and conveniently. In order to point out the advantages of these auto-switches, it will be as well to enumerate some of the inherent disadvantages of the former, all of which are overcome by the use of the magnetic pattern.

The Reliability

The instruments designated above as electrical auto-cut-in and out relays, work nearly all on the differentiating magnetic principle, though those built for purely polarity effects are said to be more reliable. The differential winding system, which is widely used, often fails in the event of a quick and large reversal of current, especially if accompanied by a fall of pressure such as occurs with severe reversals. This failure is due to the excitation of the series winding, wiping out that of the potential one. By the use of a purely polarity one this danger is overcome and the stronger the reverse current the more powerful is the operating force. Operation may also be relied upon when the drop accompanying reversal of current reduces the pressure to about one-third of the normal.

All relays for automobile use are practically modifications of central station apparatus, and mostly accurate replica and only designed to suit small plants. The most prominent feature of the miniature pattern relays is the contact making portion, which consists of either platinum, iridium, irido-platinum, tungsten, carbon pencil or copper laminæ, instead of the usually employed mercury containers and metal dippers. The magnetic circuit itself shows a variety of ideas in design and involves electromagnets of one, two or three separate bobbins of soft Swedish charcoal iron or transformer pattern strips; also less often, cast iron coil shapes of pot or solenoid construction, or a permanent field pattern. The instruments using separate coils and magnets for each circuit are supposed to be less liable to derangements. However, it has been found that no appreciable advantage is gained by so doing and makers seem to concentrate on the super-wound single magnet design with the potential winding next to the core.

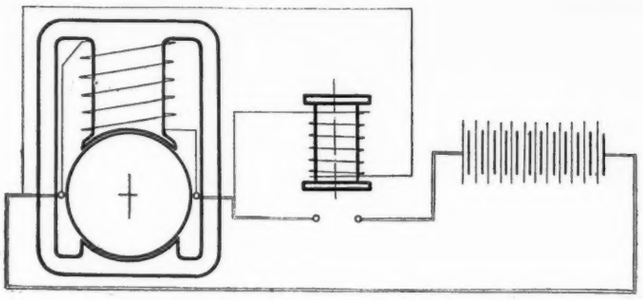


Fig. 1—Cut-out with single winding

The solenoid and pot magnet pattern coils are not so quick in action as the horseshoe types, and those employing a permanent field are also less reliable, having been often found with reversed polarity. So far, the most favored position of the field coils is the vertical, but there are a great many designs that divert from this practice, probably owing to the necessity of placing the cutting-in blade and armature in the same plane. As regards the latter, the best position is the horizontal, and either below or above the poles. The material for the moving armature should be Swedish iron preferably. Close grained, tough steel blades or rods working in upright designs have come to the knowledge of the writer, and have given satisfactory results. The current consumption of well proportioned relays is very low; in fact, it can be considered a negligible amount. Working with a small potential difference, the sparking that takes place on the parting points is very small, as in most cases a compensating double advance contact lever is fitted.

A Second Contact

A few makes also employ a second contact on the shunted current so that this latter is cut out as soon as the series winding is on the line and the current path working through the coil only. This refinement is scarcely necessary, and only makes matters more complicated. In any case, the saving of current amounts to barely 1/10 or so ampere on a medium-sized generator. It may be also mentioned that a cut-out relay should be so designed and connected with the current source that *no* induction takes place when the dynamo is not in action.

In the most primitive design of relay for charging the battery, the armature is normally held up by a shunt current passing through a magnet and dropped by it when the current falls too low. However, this type of switch is a delicate piece of instrument and, though extremely simple, has found few adherents. The cut-out with double coils is so constructed as to magnetically overcome and complete the circuit when the e.m.f. of the generator rises to the requisite point; to break the circuit and at the same time prevent reversal of the current, if from any cause this e.m.f. of the dynamo falls below the battery voltage. This instrument has one coil wound with fine wire connected across the circuit and the other in series with the generator field, carrying part of the main circuit between it and the storage battery. As a rule, the additional winding is supplied to be connected on to the source of e.m.f. by means of which the armature will hold on after the main current has fallen to zero and will only be released by the main current reversing.

A relay having three coils and of a very reliable design is the pattern in Fig. 4. The diagram clearly shows the arrangement of this switch-gear. The thick wire is loaded with the full current. On closing the main hand switch the coil *d* is energized by the full current of the battery and its core becomes magnetized. The differential coil is also excited by a current, but depending for its direction and magnitude on the difference between generator and cell voltage. As soon as the former exceeds the latter the core is repelled from *c* and the contact points connect the cells to the generator through the coarse wire coil *e*, which is so connected that the charging current conforms with the action of the differential coil before mentioned and holds on the connector on the points. As soon as the dynamo voltage falls, as on switching off or slowing down the engine, the current in *e* falls and the connection breaks by the action of gravity. There is absolutely no sparking, as the current at the time of breaking is practically nil.

In this apparatus it is important to switch off the dynamo when starting. The differential action of the magnet windings enable the contacts to work positively, even when there is considerable vibration, which is an important advantage. The windings may be so proportioned that they cut in at a certain speed but do not cut out again until a lower speed of the vehicle has been obtained. If cutting in and out movements were the same and governed by a certain speed only, the continuous vibratory opening and closing of the contact blade would cause great wear, which is contrary to what is required and expected.

Objections to Ordinary Fuses

The objection to the commonly employed fuses is that fuse wire or strip will melt at different currents, depending on the material of which the wire is made, its cross-section and chemical composition, all of which vary in different samples and even in different portions of the same material. In order that the fuse should go at a current reasonably above the working current, it must be warm all the time the current is passing through it and everything in metallic connection with it is warmed up, sometimes to an uncomfortable temperature. In order that the fuse may melt, it is necessary that its resistance should be very high, as compared with the other parts of the circuit, and the energy necessary to maintain the ordinary working current flowing through the fuse is very considerable in certain sections of the metal. The fusing current for any particular fuse depends to a very great extent on the terminals to which it is attached. If the terminals are small, or of some substance which does not conduct heat readily, the fuse will blow much sooner than if they are massive and made of a good heat conductor. The tightness with which a fuse is clamped makes a great difference in the fusing current, and, as most fuses have to carry currents which periodically change their value, the repeated heating and cooling very soon loosens them and they require to be tightened up, or else they are liable to melt much below their rated carrying capacity.

All fuses, but particularly those which require high

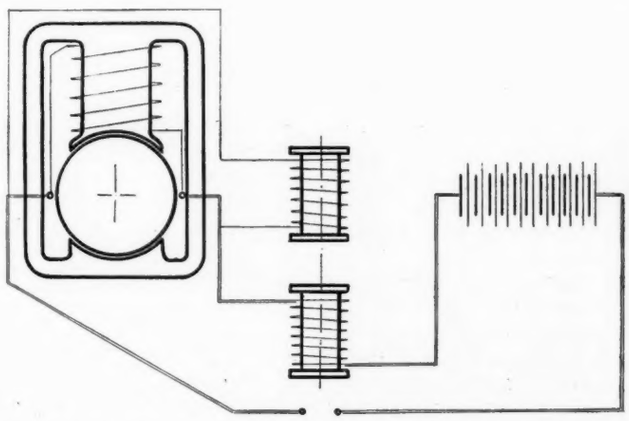


Fig. 2—Cut-out with both shunt and series winding

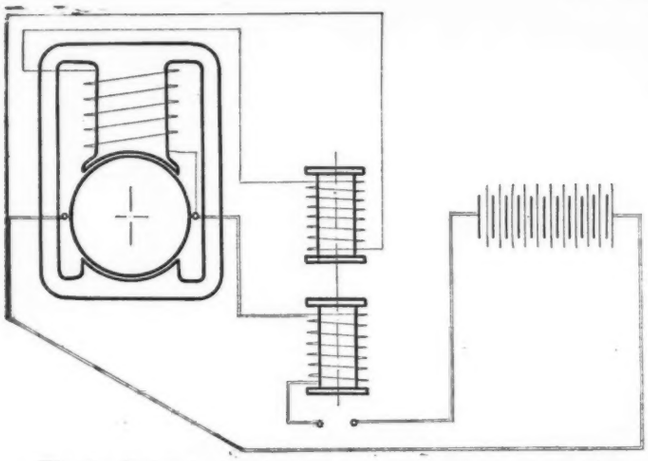


Fig. 3—Cut-out with double winding, one in series with the field and the other in series with the load

melting temperature, are subject to become easily oxidized or otherwise chemically attacked, and for this reason they have to be replaced occasionally. The replacing of a fuse which has blown is sometimes dangerous to the operator, if it goes a second or third time in succession. Fusing devices are open to abuse by having the correct sectional metal replaced by a stronger one or one of different material. On an excessive sudden current, such as that due to a short circuit, the time required to melt the fuse is of considerable length, and much damage can be done in that time.

Many more failings of metallic fuses might be mentioned, but sufficient has been indicated to show that the ordinary fuse is far from being an entirely satisfactory safety apparatus for the prevention of excess currents on an automobile.

The automatic safety-fuse switch, which replaces the fuse, consists of a substantially built switch with contacts, which is pushed against the force of a spring and is held by a catch. Near the switch is an electro-magnet with a pivoted armature which is attracted when the current flowing in either direction through the coils attains a high enough value, striking the catch and releasing the switch, which latter is immediately pulled open by the springs. The advantage of such an appliance working automatically is quite evident. When once adjusted to open above a definitive current value it will always act within a very small percentage near that quantity, no matter how long it may be left or how often it may be called into action. The only forces acting on the armature are magnetism and gravity, and the arrangement is so designed that once the magnetic attraction overcomes the weight of the armature, the latter flies up to its magnet with ever-increasing velocity until it releases the catch and throws open the switch.

Magnet Design

The magnet is so designed that the kinetic energy of the armature at the end of its stroke is considerable, and thus any variation in the friction of the catch (which is very small) is rendered negligible. In this way the critical current is entirely independent of any friction unavoidable in the switch, such as the friction of the brush between its contacts, the friction of the catch, etc. After the switch has opened, it can be easily closed again at once, but only remains so if the current is normal. When a generator is suddenly pulled up by a short circuit, the mechanical shock is very great, the armature, spindle, etc., have to bear a certain strain, which is sometimes enough to rupture or displace the connection with the motor. An electro-mechanical disconnecting switch placed in the circuit will prevent this to a very great extent, for, although the current rises very rapidly, the switch operates so soon that it cannot attain a dangerous value before the feeding system is thrown open.

The cutting-in-and-out relay described in the earlier portion of the article can be so designed as to embody the electro-mechanical disconnecting device or circuit-breaker, and will then have two armatures, each of which operates independently. If an additional winding is not objected to, it can be made to open only when the main current reverses, but without the winding it will, of course, open should the current rise sufficiently in either direction to operate the cut-in and cut-out relay armature.

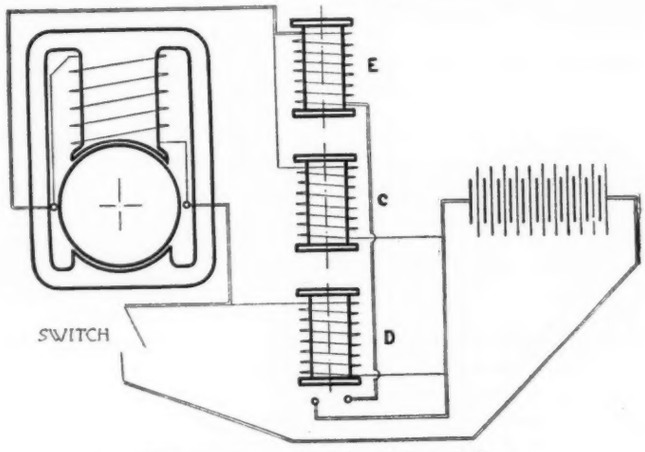
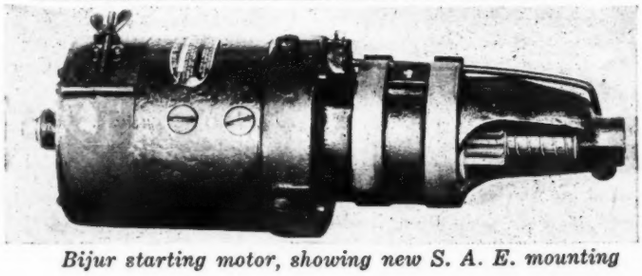


Fig. 4—Cut-out with triple winding

A French Magneto

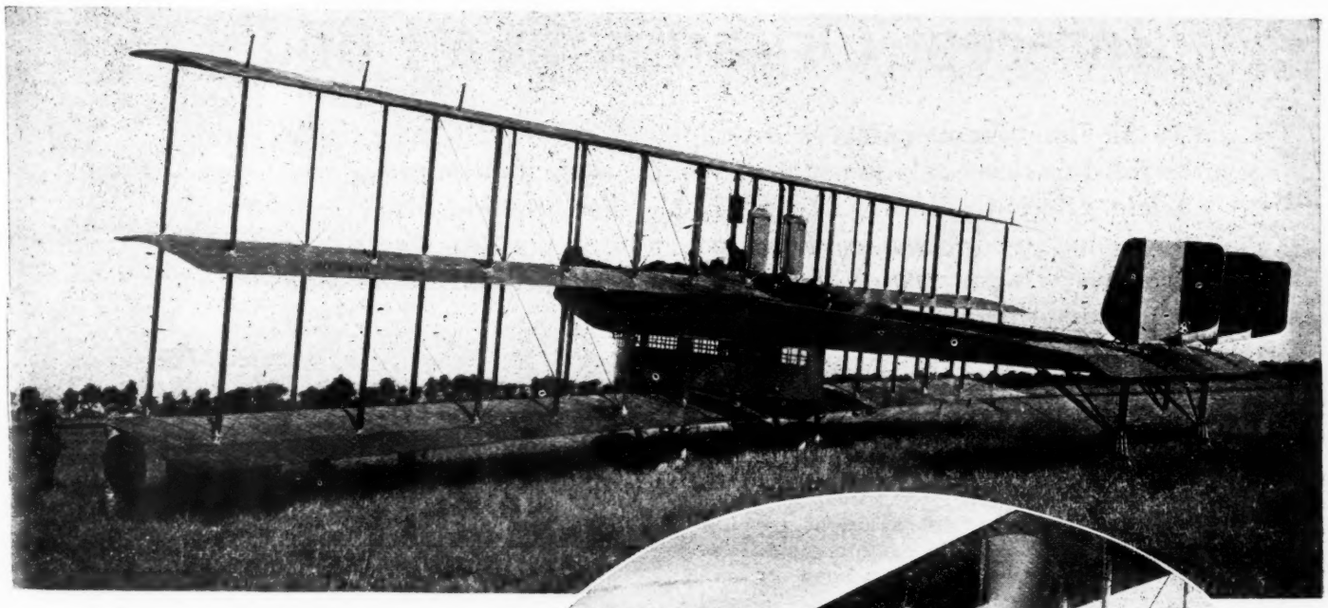
A RECENT French patent to E. Malivert describes a magneto design by which the maximum spark may be obtained for any advance or retardation of the sparking. In the usual construction the adjustment of the timing of the spark causes the break to take place before or after the time at which the maximum spark would be produced. In the design now described the poles of the magneto are embedded in a cylindrical frame of non-magnetic material —slotted to avoid eddy currents—and may be rotated so that the poles take up a position depending on the advance or retardation of the spark. By this means the break always takes place in the best position for obtaining a good spark.

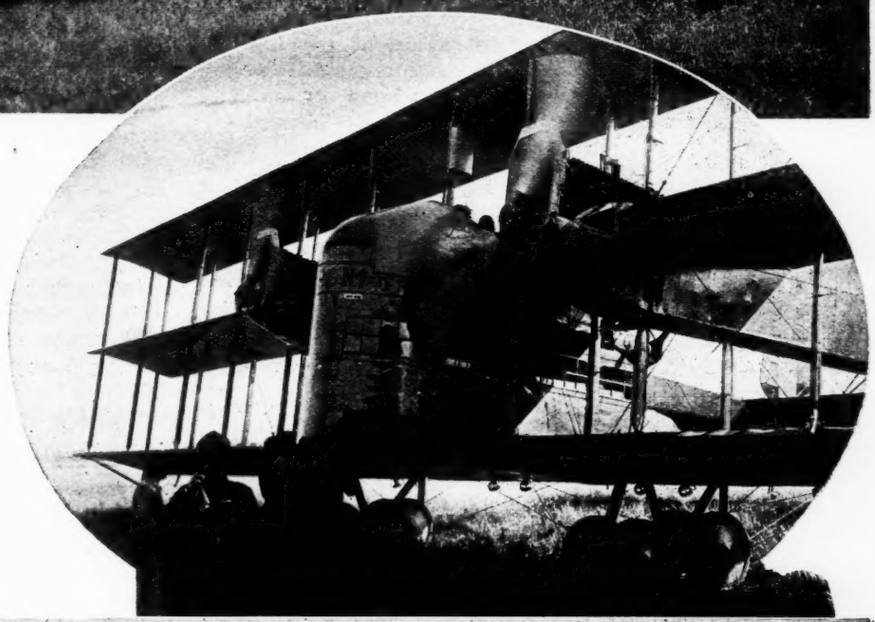
ARRANGEMENTS are being made for the construction of a works near Nairobi, British East Africa, where a motor spirit will be distilled from sugar cane. The spirit will be a mixture of alcohol and sulphuric ether.



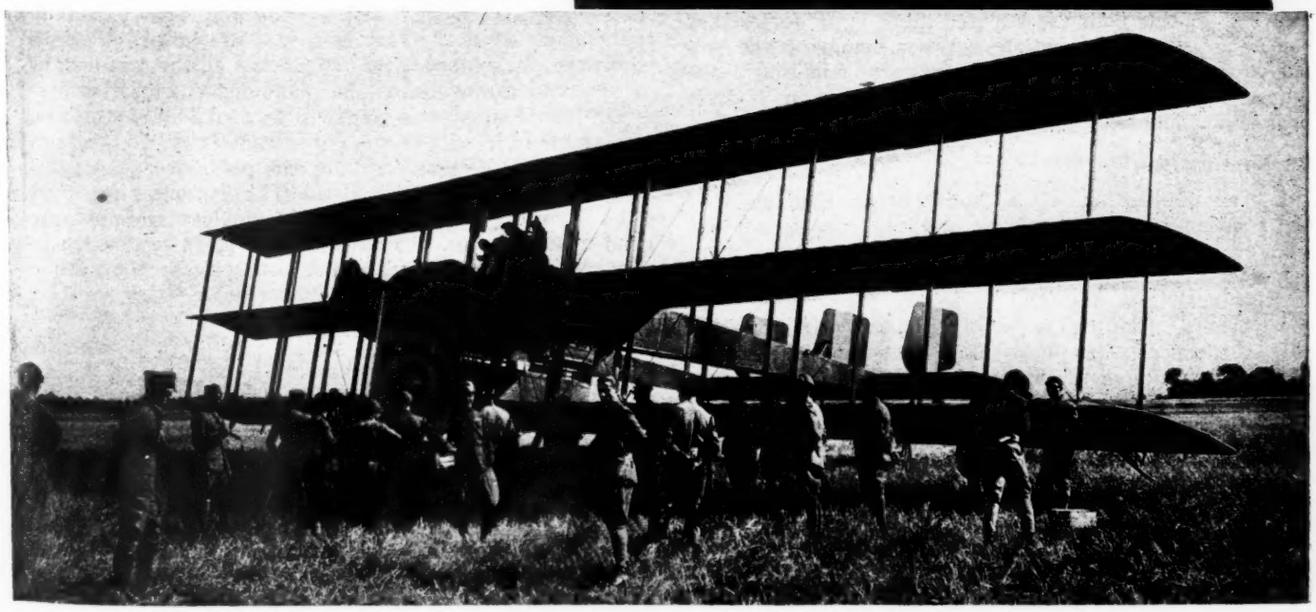
Bijur starting motor, showing new S. A. E. mounting

20-Passenger Caproni Airplane Touring Europe





THE Caproni 20-passenger airplane stopped in Paris after its flight across the Alps. It was en route to Amsterdam for the aircraft exhibition there. The cuts show front and rear views taken on the field in Paris, and the passenger cabin. It is fitted with three 400-hp. 12-cylinder Liberty engines, two being tractors and a third a pusher. The enclosed passenger cabin is entered from the front and has accommodations for 14 persons. Six more may be accommodated on the upper deck, in open air. The Caproni company has reported that it has under construction 100 triplanes equipped with five 400-hp. engines each



Make the House Organ a Human Interest Organ with a Punch

At this time when employers are studying how to reach their employees and establish a closer relationship, this study of plant or house organs is appropriate. Recently, in his articles on the labor situation, Mr. Tipper has told how some such organs are used and by inference how they can profitably be used. This review of several hundred such organs would indicate that not many of them are being so used.

By Robert E. Park*

I. THE PLANT ORGAN

What Is It?

1. Periodicals ranging from leaflets to the costliest of magazine forms, published by manufacturing and business concerns for free distribution among the employees, are generally called "house organs." Upward of a thousand are published in the United States. More than three-fourths of them are planned to stimulate the sales force—to increase selling efficiency. The others, which may be called "plant organs" to identify them, are published to create and maintain industrial morale and thus increase manufacturing efficiency.

Its Purpose

2. The house organ tries to "sell" the commodities manufactured or distributed by the concern to the salesmen. The plant organ tries to "sell" the concern itself to the workers. To sell a concern to its workers means to get their good will; and efficiency in a manufacturing plant is twenty-five per cent good will. Every large plant is a highly organized community capable of serving the men and women it employs in many ways without increasing its own cost or lowering its business efficiency. In putting its organization at the service of its employees it gains not only good will but in efficiency as well. If this policy is adopted there is no device that can so satisfactorily mediate between employer and employee and so effectively and economically maintain the morale of a working force as the plant organ, if it is properly conducted.

Its Implications

3. The publication of a house organ assumes that the relation between employer and employee is not one of mere money. It presumes that labor is not a mere commodity; or there would be no object in plant community activities designed to secure the good will of the workers. The purpose of the plant organ is to show that the concern has more to give its employees than money in exchange for work. The measure of the publication's value is its effectiveness in making the employees believe in the concern.

II. A SURVEY OF 200 PLANT ORGANS

Modeled on the Country Newspaper

1. A consideration of more than two hundred plant organs shows that, with few exceptions, they are made up of inspirational stuff, laudation of the company, plant comics and personals. Existing plant organs are modeled, as they should be, on the country newspaper. The employees of a manufacturing concern constitute a small community and news values in the small town and the industrial plant are much the same. The country newspaper prints names, just as many as it can, and shamelessly compliments the advertisers who support it. In plant organs, executives stand in the relation of advertisers, but they must be subordinated to the readers if the paper is to accomplish its purpose of building up morale. The executives get frequent favorable mention in the ordinary plant organ, but the real plant organ heroes are the men who have been in the employ of the company, in minor capacities, for a long, long time. This playing up of the old, faithful employee who has stuck to one job rather conflicts with the inspirational stuff designed to stimulate ambition.

Plant News

2. The reports of social activities, of plant welfare work, plant sports, all these have news value, but they are too often "colored," to employ a technical newspaper word. This may be done quite unintentionally by the editor. His eye is inevitably on his employer rather than upon his readers because the employer pays and the readers do not. This is a vice of the press agent, wherever he is used. So far as the editor loses sight of his readers, he makes the plant organ a useless luxury. The ideal plant organ will be sold to the workers. The paper that sells is the paper that is read. Articles which are of the plant and for the plant are most valuable, because they are news. The entertaining food talks by the plant chef in one periodical are not only good in themselves, but have a great additional value in that one of the workers, a real authority, is the author of them.

Safety

3. Most plant organs realize the importance of safety and health for the employees. Many of them show actual photographs and cartoons of accidents. These drive their lessons home. Pictures and graphs are more convincing than statistics of accidents and workers are glad to know these things. It is to the interest of the company that they should. One paper, however, is more enterprising. It prints articles on "safety in the Home." This suggests some of the possibilities of the plant organ that have not yet been developed. Anything

*Professor of sociology, University of Chicago.

that interests the plant community, particularly if it has not been made accessible to the readers of the organ elsewhere, is "good stuff."

Health

4. Much of what is printed about health is reprint, and rather casual. One paper, however, has the courage to print in one issue a long and admirably written article on venereal diseases by the War Department Commission on Training Camp Activities; an article on measles by the plant surgeon; and an article on hernia. The people to whom the paper goes lift heavy weights. These articles on health alone give the paper a real reason for being, which is lacking in most plant organs.

For Women and the Home

5. Many plant organs print recipes. This department, like pictures of children, fashions, and garden articles, are planned to interest wives, mothers and sisters. But the publication just referred to prints proven recipes of its own people, while the garden department in another plant organ is conducted by the garden supervisor of the plant. The fashion departments, which contain merely reprints from women's magazines, are not valuable. If we were to judge by what appears in the papers we have reviewed, we should conclude that none of the women in the two hundred plants have designed a garment for the shop or for the home that is worth reporting.

Education and Americanization

6. Education receives a vast amount of serious consideration in the big industrial plants. Americanization especially has become significant where large numbers of foreigners are employed, and many plants are giving special attention to this work. The reports of these activities make dull reading for the most part, however. One gains the impression that they are printed for personal gratulation rather than to make the work interesting to the employees. Some plant organs publish pictures of the Americanization Class. Unconsciously there creeps into reports of the work something of that patronizing spirit toward the foreigner by which well-meaning patriots are converted into impertinent mischief makers. Now and then one runs across an admirable idea, expressed simply and colloquially; as for example, an article which urges us not to make fun of the foreigner's mistakes, but try to set him right in a kindly, human way.

Suggestions from Employees

7. There are plant organs which show workers that it pays them to make suggestions. One announces the award of prizes ranging from $2 to $100 for suggestions, but it skids painfully in the way it presents the awards. The opportunity to make all of the workers acquainted with a department, to show its relation to their work, is overlooked. Another asks for suggestions with much sound sense. But the suggestions themselves are not handled in a way to inspire enthusiasm.

Public Questions

8. For the most part important problems are ignored, and when the organ does essay them the result is sometimes painful. A worker sent to the editor of one plant paper some clippings about the Bolsheviki, pointing out that they were "different from your lying description," but he doesn't blame the editor for the lies that appear in the paper because he knows so far as editorial policies are concerned "she is editor in name only." The editor uses some two thousand words in reply. They are the same kind of words that the radical uses, and the things she says are as intemperate, as abusive and not nearly as interesting as the utterances of the soap box performer who verbally tears the capitalist limb from limb and drinks his blood in full sight of the audience. A house organ is a perfectly good place in which to discuss Bolshevism, but the editor should know the facts and be able to state them.

What the Editors Overlook

9. It is curious that the consideration of the two hundred plant organs failed to disclose that any worker has built himself a home, or that any worker has any ideas about a home. But this merely confirms a general impression that none of the workers do anything except what the editors want them to do. One misses from the pages of these periodicals our old newspaper friends, "Pro Bono Publico," "Veritas," "Vox Populi" and "Fair Play." Is it possible that these personages do not exist in modern industrial plants? Or are the workers led to believe that a plant organ is not exactly the proper place in which to voice complaint and discontent? It need not be so. Publicity is a form of moral sanitation. One way to dispose of grievances is to give them light and air. The plant organ might eventually perform that function.

Inspirational Matter

10. Not long ago a plant paper published a cartoon of a man carving himself out of a block of marble, which other plant organs straightway reproduced. But this inspirational cartoon, as well as the inspirational articles about men forging ahead, loses force when one notices the consistent canonizing of the good old faithful employees who have devoted their whole lives to holding down one humble job. Employers have only recently begun to realize that the employee wants something more than wages. He wants security, i. e., insurance against accident, unemployment, etc. He wants new experiences, i. e., education, recreation, novelty. He wants also recognition and response, i. e., appreciation, fellowship and affection. The plant organ can do much to meet these needs, but it cannot do it by inconsistent preaching. Nor will good preaching alone do it. The employees must be given real evidence in the form of facts showing how individual workers in the plant have had these wants satisfied.

III. SUGGESTIONS FOR IMPROVING THE PLANT ORGAN

General Rules

1. It is not possible to lay down rules for the making of a plant organ, because no two plant communities are the same. Each has its own individuality and its own traditions. The plant organ is merely one detail of the problem of personnel. Past policies will very largely determine present possibilities. This means that before a plant organ is installed a survey should be made of the plant itself. I would make a study of the plant to discover the news particular to it and the spirit of it, for the character and quality of the news would determine the choice of material and the method of presentation. The editor should talk about problems in the plant and how they were solved.

Making the Plant Paper Interesting

2. The first consideration of any publication is that it shall be interesting. That which makes a plant organ interesting is the news of the plant and its workers.

A plant organ should reveal all the activities of the concern to its workers, make them acquainted with every department of its industry and its business. It can present the trials of a worker and the tribulations of the foreman over him. Let some of the men talk about bosses, criticizing them if criticisms are just. And let the foremen write about their experiences with unreasonable men. It can persuade some of the radical groups to reveal themselves in the organ. These men make the worker think. He needs to think. Ideas are never dangerous when they are expressed in the same context with other and different ideas. The editor can swap their arguments if he goes about it in a pleasant and intelligent way. The plant organ can discuss the trade union if the editor knows the subject. In fact, there shouldn't be a subject that is a matter of concern to the working folk that it should not be free to discuss.

Personal Items

3. The personals make the workers read the publication. The thing of first importance in anything that is printed, even an advertisement, is that it should be read. If it is to be read it should be short and interesting. The personal item meets that requirement. Other things being equal, items are read in inverse ratio to their length. A plant organ can tell stories of getting ahead in the home. It can tell how the problems of the bachelor girl and the man are handled, taking up housing questions. Stories of men who worked up, written by their fellow workers, are always effective. Amusing incidents in the shop, births, marriages, deaths and descriptions of social activities are always of human interest.

"Make Up"

4. As a rule plant organs are either too cheap or too costly. Their physical appearance—"make up" is the technical term—is often wasteful and unattractive. If I were to publish a plant organ, I would consult a typographical expert to find out how to make the lay-out attractive and yet economical to print. Many plant organs would save money on printing if they were set up more attractively.

Editorial Policy

5. What plant organs need most is a definite policy, and the most important part of that policy is the attitude of the editor toward the employer who supports the paper and the workers who are the readers. For the most part plant organs ignore the big news, the things that most profoundly concern the workers, because it might not please the board of directors. A plant organ that does not provoke a protest from at least one director every month and doesn't make some workers write a hot letter to the editor will never get very far. Most plant organs are edited *for* the executives and *at* the employees. They give the impression of exploiting the workers for the benefit of the employers. If this suspicion, usually latent, becomes defined, the plant organ does more harm than good. A department of "For Sale and Exchange" like that published by one plant organ goes much further toward convincing the employees that the magazine is published for them than the most persistent assurances of the editor. The keynote of the plant organ must be participation; participation of the employees or readers in determining the policies of the paper. This means planning the magazine to meet the wants, expressed and inarticulate, of the workers.

Planning the Contents of the Plant Organ

6. Two serious articles in each number are enough—one general and one relating directly to the plant. The first may be a discussion of some public question of interest to wage earners, but always it must be tied up with the company's policies; or it may be a practical answer to the expressed views of some revolutionary workman, in which case the article must show an understanding of the worker's point of view. The second article can feature educational points—safety, health, training or efficiency; or Americanization, higher standards in the home, in family relations, citizenship, and in relations between foremen, men and employers. Plant news featuring what is going on in every department appeals especially when it brings out the human and the humorous side; and there is always a demand for personal items. Comics should as far as possible describe actual happenings in the plant. In every issue place should be made for each of these topics. Inspirational matter—stories of personal achievement, marks of appreciation and fellowship—brings supporters to the paper and builds up morale. The same holds true of publication of complaints and suggestions by the workers with answers by the management showing concretely its policy of assuring to every one a square deal. Something of this nature must be included as frequently as possible. Above all, every issue must be interesting from cover to cover. It takes more effort to make people read a paper given to them than one they buy. Therefore, the appearance of the paper must always be attractive and it must concern itself with the affairs and personalities of the employees, and not of the employers or office men.

Rubber Planting in West Dutch Borneo

RUBBER culture has extended greatly in West Dutch Borneo in the last ten years. Nearly 90 per cent of the plantations belong to Chinese, Malayans, and, more recently, to Japanese. The climate is well suited for rubber; rain falls the year around, and there is no dry season, as in Java. Labor conditions are favorable, for Borneo has plenty of native laborers, Dyaks for the hard work, like felling the jungle, and Malayans for lighter work, like weeding, tapping, etc. Most of the estates are of comparatively small size. Nearly every Malayan has an estate of 50,000 to 60,000 trees, too closely planted, and their handling of the crop is primitive. They borrow of the Chinese, who in that way come to own plantations too, while the Malayan sinks to the status of a coolie. The rubber production of West Borneo was as follows:

1915	*pounds*	100,936
1916		313,616
1917		542,145
1918		750,640

It is expected that in five years the output of the Sambas estates alone will be 6,600,000 lb.—*India Rubber World.*

AT the instigation of the Birmingham Chamber of Commerce a resolution was adopted at the meeting of the Association of British Chambers of Commerce urging that "steps be taken to provide for the prolongation of all patents for the period of the war and for one year after, in view of the very serious loss which has fallen on patentees in consequence of the compulsory suspension of the working and development of their patent rights."

Fuel Pump for Airplanes

THE problem of insuring an adequate and unfailing supply of fuel to the engine or engines of modern airplanes deserves the serious thought of the designer. Wind-driven centrifugal pumps are widely used for raising the fuel from the main tank, usually built into the fuselage, to a service tank inside or on the upper main plane, from which the feed to the carbureter is by gravity.

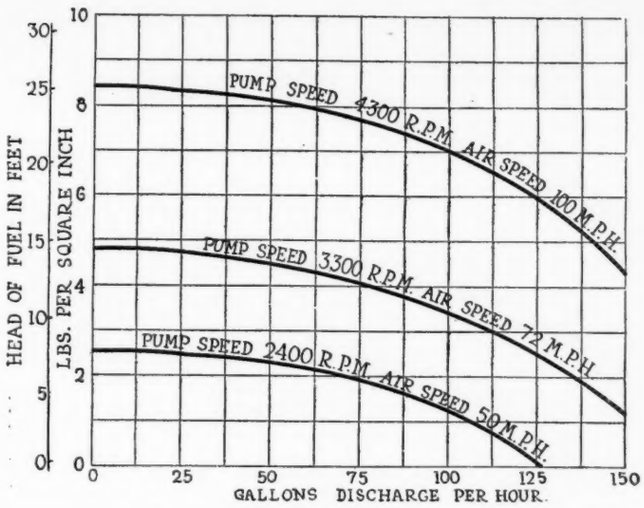
The over-all efficiency of such pumps is low, but from the standpoint of reliability they leave little to be desired, and as compared with mechanically-driven pumps, they possess the advantage of allowing greater latitude as to the position in which they are fitted on the machine.

The pumps are usually attached to the fuselage, to the front spar of the wing, or to one of the inter-plane struts. If possible, they are placed below the level of the main tank, so as to avoid difficulty in starting up; otherwise a foot valve must be fitted in the inlet pipe in order to keep the pump primed. They are also fixed in the slip stream of the main propellers, more for the purpose of insuring a supply of fuel when the engines are running before the machine leaves the ground than for increasing the speed of the pump. Actually the quantity of fuel delivered is always in excess of the requirement of the engines, the surplus returning from the service tank to the main tank through an overflow pipe, which, in some cases, is fitted with a sight tube to enable the pilot to satisfy himself that the fuel supply is being properly maintained.

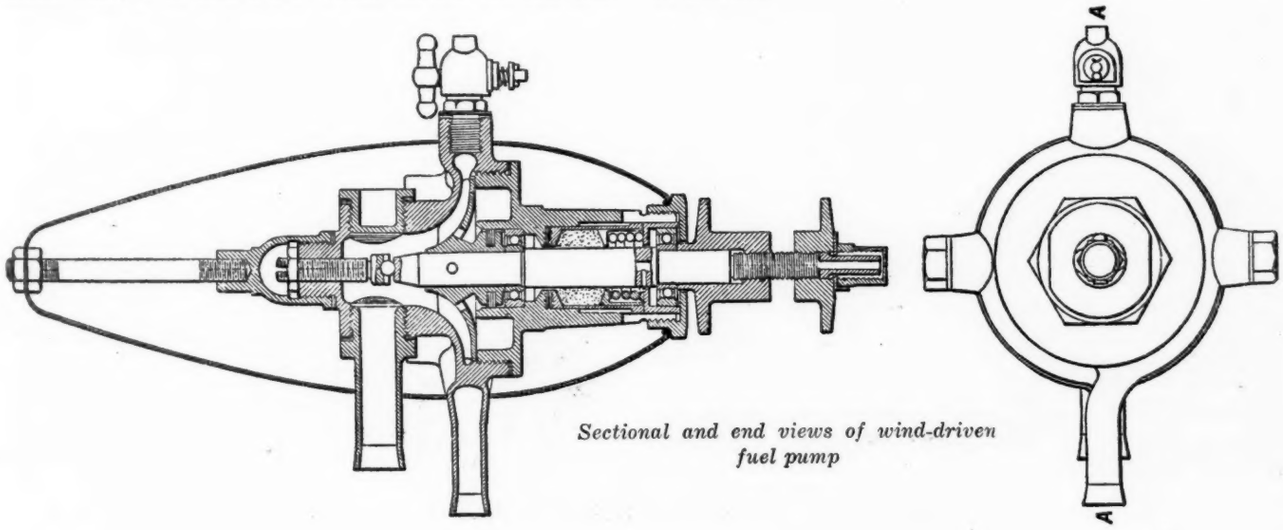
Details of Wind-Driven Pump

The two sectional views herewith show a centrifugal wind-driven pump manufactured by Vickers, Ltd., London. The propeller (2 in. diameter) and pump impeller are mounted on the same shaft, which is of steel, case hardened and ground, and runs in a pair of ball bearings. The impeller, which is of aluminum, with radial vanes, is pinned to the shaft, and runs in a bronze casting, which forms the volute chamber, and also carries the suction and delivery connections. The connections shown are of the well-known olive type, for use with flexible pipes, but screw connections for metal tubing can be fitted if preferred.

Into the bronze casting previously referred to is screwed another casting of aluminum, which carries the ball bearings and also the gland through which the shaft passes. This gland is packed with asbestos fiber, impregnated with graphite, and the packing material is kept under constant pressure by means of a helical spring bearing on a pressure ring, which can slide freely in the gland. The gland can be easily repacked *in situ*, or it may be removed when worn, and replaced by a spare part. The body casting is split longitudinally, so that it seats the ball bearing and removable glands firmly when the cap is screwed up. The thrust of the propeller is partly balanced by that of the fuel on the impeller, and the residual thrust is taken on a single steel ball at the end of the shaft. This ball can be adjusted longitudinally by means of a screw, and thus serves to fix the position of the impeller in the volute chamber. The latter is provided with four tape bosses for fixing, and is also fitted with a small petcock to allow any air which may become trapped in the casing to escape. The whole is enclosed in an aluminum casing of stream lined form, made in two parts, and attached to the pump as shown. The weight of the pump, complete with a two-bladed propeller, is 2 lb. The capacity of the pump under different conditions is shown by the diagram herewith, from which it will be seen that when running at 4300 r.p.m. in a wind speed of 100 miles per hour, the pump will deliver 100 gal. per hour, against a head of over 20 ft. The above information is taken from *Engineering* of London.



Delivery of fuel at different speeds



Sectional and end views of wind-driven fuel pump

A Heavy Duty Engine for Tractors and Trucks

While not a wholly new design, this engine has its points of interest. The drawings show how the valve rods are enclosed and how nearly the dust-proof idea is carried out; also, from the drawings and description, how it gets the name "bulldog."

HAVING confined itself chiefly to the manufacture of tractor engines during the past two years, the Weidely Motors Co. is seeking a wider field and has announced a 4-cylinder 3¾ x 5½ in. engine suitable for heavy duty truck and tractor work. It is arranged for 3-point suspension, using No. 3 S. A. E. bell housing to enclose the flywheel.

Provisions have been made to mount either magneto, or ignition, lighting and starting equipment with what is now considered standard S. A. E. mountings. All bolts, studs and nuts are S. A. E. standard and securely locked with either cotter pins or lock washers. Where it is considered necessary, for instance on the studs that hold the motor head to the cylinder, special nuts are used for the purpose. Where studs are screwed into various parts, threads are usually 1½ or more diameters long.

The four cylinders are cast integral with the upper half of the crankcase. This integral construction insures proper alignment of cylinders and bearings, as well as strength and rigidity. The cylinders are bored, reamed, and, after several weeks of an annealing process, ground to size. Ample water jacket space surrounds each cylinder barrel.

Motor Heads Removable

The motor heads containing the valves, the intake and exhaust ports are removable and are fastened to the cylinders through ten nickel steel studs.

Pistons are provided with cross ribs above the wrist pin lugs to support the dome. They are fitted with three rings, and also have the necessary oil grooves cut and drain holes drilled to insure a clean exhaust. The wrist pins are permitted to float in the connecting rod as well as in the piston, and are held in place by a snap ring in each end of the piston pin hole. The wrist pin is made of alloy steel, hardened and ground.

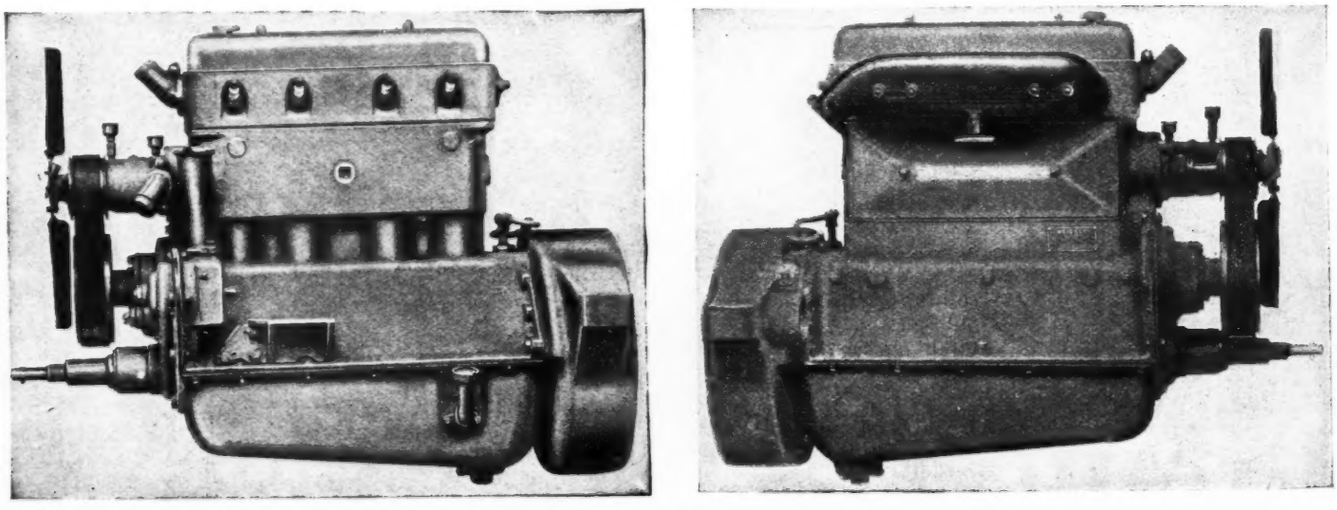
Connecting rods are alloy steel forgings, heat treated, fish-back section in the shank instead of the somewhat conventional "I" section. The makers have found that the fish-back section insures better forgings, more rigid connecting rods and less liability to cracks and cold shorts during the forging process. The upper end, into which the wrist pin fits, is lined with a bronze bushing, while the big end has a very large babbitt-lined, brass-back bearing, which is adjustable by the use of laminated shims and four nickel steel bolts.

Crankshaft

The crankshaft is mounted on three bearings in the crankcase. It is drop forged, heat treated and accurately machined. The flange for mounting the flywheel is forged integral with the crankshaft.

Like all other internal parts of this motor, the crankshaft is carefully sand-blasted to remove all scale and grit. Provision is made by an adjusting nut on the front end of the crankshaft to take up end play, and large flanges are forged on each side of the bearings to take up the clutch thrust. The shafts are drilled throughout for pressure lubrication.

The camshaft is mounted in three phosphor bronze bear-



Right and left side views of Weidely "Bulldog" truck engine

ings, is drop forged of case hardened steel with integral cams, and the flange for mounting the driving gear is also forged integral with the shaft. The bearings are slightly larger in diameter than the cams, to permit of easy withdrawal from the bearings.

All main and connecting rod bearings are made of bronze, lined with No. 24 S. A. E. babbitt metal. They are of ample size to maintain low bearing pressures and are provided with oil grooves to insure the necessary lubrication. The crank main bearing and connecting rod bearings are split and adjusted by laminated brass shims.

Timing gears are helically cut on automatic hobbing machines. The relief valve in the oiling system overflows onto the timing gears.

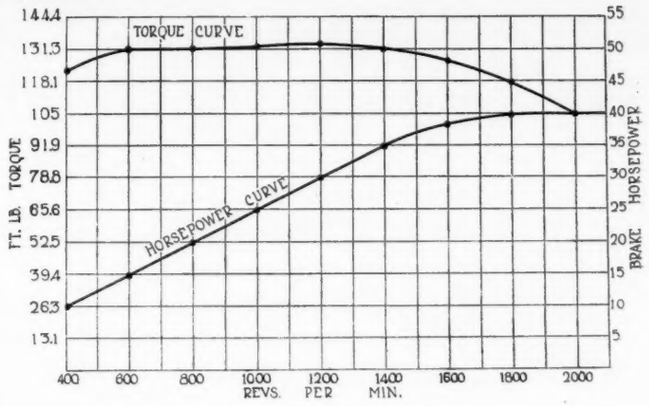
Valve tappets are of the mushroom type, case hardened and accurately ground to size. A large removable pressed steel plate with oil-tight felt gasket covers the valve tappets, keeping them free from dust and dirt.

The inlet and exhaust manifolds are cast integral and are made of cast iron. They are fastened to the motor head by means of studs, and are provided with copper-covered asbestos gaskets. The design of the inlet manifold insures that the intake gases are sufficiently heated to effect proper vaporization of the fuel.

Water Circulating Pump

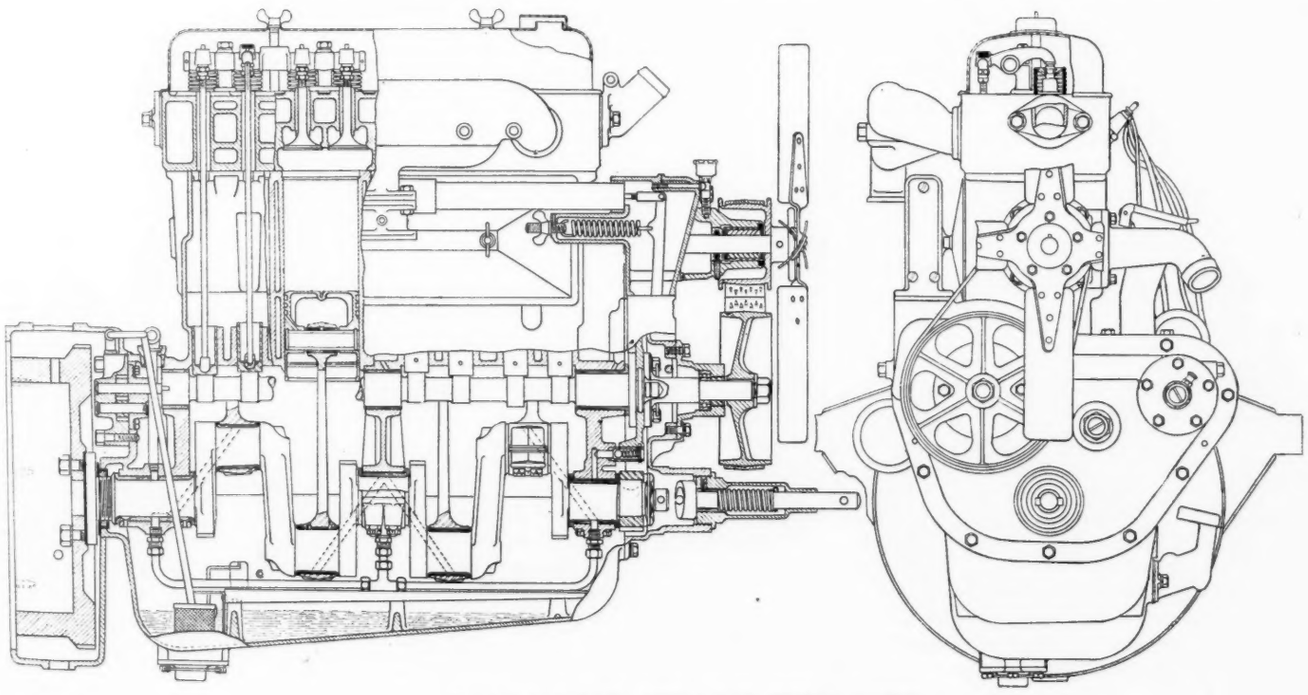
The water circulating pump and fan are both mounted on a hardened and ground shaft, and are driven by a 2-in. fan belt. The pump impeller projects into the front end of the cylinder water jacket and forces the water in and around the cylinder barrels. Water ports are distributed between the top of the cylinder castings and motor heads to insure a uniform flow of water around the cylinders as well as around the valves and spark plugs. The fan, being mounted on the forward end of the pump shaft, is supported in an extension on the pump body castings through a Hyatt roller bearing. The stuffing box is packed with metallic packing.

The oil pump, mounted on the rear end of the motor, is direct driven by the camshaft. The oil is forced through a tubular header to the three main bearings and through a hollow crankshaft to the connecting rod bearings, also through holes drilled in the webs of the upper half of the crankcase to the camshaft bearings. A gauze strainer is fitted around the oil pump suction to prevent sand or grit getting into the oil. This strainer can be removed without disturbing the oil pump, underpan or other parts. A sufficient quantity of oil is thrown off the connecting rods to thoroughly lubricate the pistons and cylinders. The pressure relief valve is placed in the gear case in the front end of the motor, thus lubricating the timing gears. An oil gage bolted to the side of the crankcase indicates by means of a float the amount of oil contained in the oil basin.



Power and torque curves

On the front end of the magneto shaft, and within the gear cover, is located the fly-ball governor, which is connected to a bell crank through a cross shaft. Pivoted on this bell crank is the governor spring. This is adjustable from the outside and has facilities for locking. Through a connecting link the bell crank is connected with a separate butterfly located between the intake pipe and carbureter. The entire governor mechanism is enclosed, and after one sealing the adjustment on the governor springs no changes can be made without breaking the seal.



Section and front elevation of Weidely engine

History of the Development of Helium

Helium is generally looked upon as being the solution of travel by inflated aircraft. The disastrous experiences of the Germans with their dirigibles during the war, the accidents in this country since the armistice and the nervousness admitted by the crew of the R-34 all are arguments for a non-explosive gas. A shipment of helium was on its way to France when the armistice was signed, and some day, it is hoped, this gas will be produced at a price that will admit of its general use in balloons and dirigibles. This article tells at what cost to our government this gas was developed during the war.

At a conference held in Washington in the fall of 1917, which was attended by representatives of the Bureau of Mines, representatives of oxygen producing concerns and members of a British commission on helium, a recommendation was formulated that an appropriation of $500,000 be made available from Army and Navy funds for four experimental plants for helium production, under the systems of Linde, Claude, Norton and Lacy. Later the Lacy system was dropped. A bulletin recently issued by the Bureau of Mines (Bulletin 178) gives a history of the developments in helium production since that time, from which the following is taken.

The $500,000 allotment was appropriated pursuant to a resolution of the Aircraft Production Board of October 17, 1917, but, on the recommendation of the Navy Department, the Norton process was excluded from the benefits of any share thereof. This unexpected action was embarrassing both to the Bureau of Mines and to the British commission, but the Navy Department adhered to it and induced the War Department to take the same stand.

Not until, at the Navy Department's insistence, the Norton process had been submitted to the searching examination of the National Research Council and that body had, by the unanimous action of a special committee, reported favorably on it Jan. 14, 1918, was a further sum of $100,000 made available for the Norton process, on Jan. 18, 1918. The special committee of the National Research Council was composed of Dr. Harvey N. Davis, of Harvard University; Dr. Edgar Buckingham and Dr. C. W. Waidner, of the Bureau of Standards; Dr. W. S. Landis, of the Air Nitrates Corporation; and S. L. G. Knox, consulting mechanical engineer, and later scientific attaché of the United States Embassy at Rome.

The Norton Process

The Norton process is the latest practicable development in liquefying and separating gases. The Linde process (Plant No. 1) depends upon the so-called Joule-Thomson effect, obtained by the sudden expansion of a highly compressed gas through a small orifice, or nozzle, and the consequent cooling of the gas, the process being elaborated into a self-intensive or cumulative cycle of heat interchange by causing the cooled gas, on escaping, to circulate around the tube leading the initial gas into the apparatus.

George Claude, of Paris, conceived the idea of a liquefaction cycle with an expansion engine interpolated. Although the Joule-Thomson effect is used in the Claude cycle(Plant No. 2), its value is reduced to a minimum because the compression of the gas in this system is lowered. The maximum cooling effect is produced by the expansion engine because the compressed gas, on expanding in the engine cylinder, is made to do work and thus its temperature is lowered.

In the Norton process (Plant No. 3) three expansion engines are used, liquid is throttled, and the heat interchanger and fractionating still are of new design. In the Linde system an enormous expenditure of power is demanded to compress the gas in order to obtain the maximum effect of throttling, and this energy is then wasted. The Claude system requires much less compression power, but in this system the energy stored in the compressed gas is also dissipated. In the Norton system the requirement for gas compression is reduced to a minimum by the interpolation of the multiple-expansion engines, and what is needed is conserved and reapplied through the energy developed by these engines. Thus the maximum cooling effect is obtained at a minimum cost.

Argon Plant No. 3

Construction of the Bureau of Mines (Norton process) plant, later known as Argon Plant No. 3, on the enlarged basis of a maximum production of 30,000 cu. ft. of helium a day, was begun on April 3, 1918, and was completed Oct. 1, 1918. The cost was $148,398.29, the estimate for the plant enlarged to the proportions given having been $150,000. During the early construction work at this plant Mr. Biddison's services were of especial value; succeeding him, April 20, 1918, George A. Orrok was appointed consulting engineer of the Bureau of Mines and has since been identified in this capacity with Plant 3.

The first site picked for the helium plants was at Fort Worth, Tex., selected by Messrs. Norton and Biddison, but later the Otto, Kan., region was deemed more advisable, as the natural gas there is exceptionally rich in helium; the supply, however, proved inadequate. The Bureau of Mines plant (Norton process) was then located at Petrolia, Tex., adjacent, for obvious reasons, to the properties of the Lone Star Co., but the plants of the Linde Co. and the Air Reduction Co., because of their requiring more water and more power, were built at Fort Worth, about 100 miles to the southeast, and were supplied with Petrolia gas through the Lone Star Co.'s pipe line.

The approximate cost of Plant No. 1 (Linde) was $245,000; that of Plant No. 2 (Air Reduction) was $135,000. The capacity of the first plant for producing 90 per cent helium from 0 4 per cent to 1 per cent helium-bearing natural gas was 5000 cu. ft. a day, and that of the second was 3000 cu. ft. a day.

Plant No. 1 was the first to start, March 6, 1918. Its

production of helium began April 8, 1918, when 27 per cent gas was obtained. Progressively better results were achieved until a purity of about 70 per cent on straight runs was reached. By reprocessing, the purity of this gas was raised to 92½ per cent.

Plant No. 2 began to operate May 1, 1918, and on May 13 finally produced gas of 62 per cent to 70 per cent purity, which was reprocessed by Plant No. 1 to 92½ per cent. In all, about 200,000 cu. ft. of 92½ per cent helium has been produced by Plants 1 and 2. This gas has been stored in steel cylinders at a pressure of 2000 lb. to the square inch, each cylinder containing about 200 cu. ft. expanded to atmospheric pressure.

Of these cylinders 750 were ordered sent to France for aeronautic purposes and were on the dock at New Orleans awaiting shipment when the armistice was signed. They were returned to Fort Worth.

In order to co-ordinate properly all the different agencies concerned in the helium project, and to take steps for controlling effectively the exploration and conservation of helium, a committee consisting of one representative from each of the three governmental departments chiefly concerned was appointed by resolution of the Aircraft Board on Aug. 23, 1918. G. O. Carter, chairman, represented the Navy; Dr. Harvey N. Davis, the Army; and George A. Orrok, the Department of the Interior. Up to and including Oct. 23, 1918, there had been recommended and allotted from Army and Navy appropriations, in equal share, funds aggregating $1,090,000 for Plants 1, 2 and 3 and expenses incident to their maintenance and operation.

The expenditure of this $1,090,000 has not only added vastly to human knowledge, but has supplied a commodity worth, at pre-war prices, approximately from $250,000,000 to $400,000,000; and has prepared a war weapon for the United States of incalculable potency.

In August, 1918, the War and Navy Departments, realizing the paramount importance of insuring a supply of helium for military purposes, determined to build a large plant that would produce 30,000 cu. ft. of the gas a day. This plant, to be constructed along the lines of the Linde process, is to be situated at Fort Worth, Tex., and arrangements have been made for a lease of the Petrolia gas pool and for a Government pipe line to convey gas from Petrolia to Fort Worth.

On Dec. 8, 1918, the Aircraft Board submitted a report to the Secretary of War and the Secretary of the Navy, in which the change in the military situation because of the signing of the armistice was noted, the helium situation was reviewed, and recommendations for the future were made. Four different programs for further work on helium were submitted, that designated as "Plan C" being preferred. This was as follows:

Operation of Plant No. 3 for 3 months	$36,000
Construction of production Plant No. 1	1,700,000
Operation of production Plant No. 1 for 8 months, producing 7,200,000 cu. ft. helium	750,000
Pipe-line construction	1,800,000
Petrolia field lease	1,500,000
Total expenditures	$5,786,000
Salvage	500,000
Net cost	$5,286,000
Helium production, cu. ft.	7,200,000

On Dec. 17, 1918, the Director of the Bureau of Mines, in a letter to the Secretary of the Navy and the Secretary of War, submitted a report by the engineers of the bureau. This report outlined a plan similar to "Plan C," but provided for further operation of all three experimental plants, also for a new Claude unit, and included a fund for conservation purposes. The bureau's engineers were convinced that the cost of producing helium had not been reduced to a minimum and that undoubtedly in the long run money would be saved by perfecting producing methods through further experimental work.

One Plant Continues

On Dec. 27, 1918, the Secretary of the Navy wrote to the Director of the Bureau of Mines disapproving further experimental work by the Government, other than the small amount countenanced for Plant No. 3, under "Plan C," and advising him of the adoption of "Plan C." On Jan. 9, 1919, Maj. Gen. Jervey, of the General Staff of the Army, wrote advising that the War Department concurred in the action of the Secretary of the Navy and that the accomplishment of "Plan C" would be entrusted to the Navy Department.

Pursuant to this plan, the director of the Bureau of Mines ordered Plants 1 and 2 shut down on Jan. 23, 1919, but asked that Plant 2 be permitted to continue work, at its own expense, for a limited time in order to try out an improvement in its apparatus. On this basis, the Navy and War Departments consented to the further operation of Plant No. 2, the Navy agreeing to furnish gas of a higher helium content from its new pipe line (contemplated under "Plan C") when this would be completed, about May, 1919.

Although only $36,000 was provided for further operation of Plant No. 3, under "Plan C," a visit of inspection to this plant by Commanders H. N. Jenson and H. T. Dyer, Lieut. Commander Smith and G. O. Carter, on behalf of the Navy Department, about March 15, 1919, so convinced the Navy officials of the exceptional merits of the Norton process and the possibilities of the plant in respect to producing high-purity helium at a minimum cost, that they became strongly in favor of affording it every opportunity to prove itself.

Production Begun

After overcoming many obstacles that could not be foreseen, Plant No. 3, on April 2, 1919, began to produce helium, and by 5.30 a. m. April 3 a purity of 19.8 per cent was reached. Helium production continued until that afternoon, when it became necessary to shut down for some minor repairs. On April 17 21 per cent helium was made, and it is confidently expected that helium of the highest purity will soon be produced by this plant on a large scale.

On April 15, 1919, the Director of the Bureau of Mines called a conference in his office to discuss matters incident to the further operation of Plant 3 and kindred matters. There were present, besides the Director, Commander Jenson, representing the Navy; Col. C. DeF. Chandler, Col. A. L. Fuller, and Dr. H. N. Davis, representing the Army; and George A. Orrok, Fred E. Norton, L. H. Duschak, W. A. Ambrose, and Andrew Stewart, representatives of the Bureau of Mines.

Fred E. Norton, who had come from Texas for the purpose, gave a detailed report on the operation of Plant No. 3 and described the need for alterations in and additions to its apparatus to insure the greatest possible efficiency. It was the sense of the meeting that liberal allotments of funds should be made for the continued experimental operation of the plant, with regard to its ultimately being run as a production unit. As a result of this conference, the Director of the Bureau of Mines recommended an allotment of $100,000 to make the alterations and acquire the equipment referred to. This fund has been made available, one-half by the Army and one-half by the Navy.

Fallacy of the One-Man-One-Job System in Industry

Do you know what monotony means? How often have you complained of the monotony of life, of the weather and of other surroundings? If you are an employer have you ever stopped to think of what monotony means to the man who must do the same simple task over and over, a dozen or a thousand times a day and, in addition, resist the natural monotony of weather and surroundings? Mr. Tipper's article this week is on the monotony of the one-man-one-job system and its effects. He brings it home with an actual incident that you cannot afford to miss.

By Harry Tipper

THE question of one-man-one-job in modern industry has interested me for many years, and since industry itself has been willing to question methods of organization and experiment in the endeavor to find new bases for proper organization, I have been dipping into the matter quite closely.

I have just concluded a careful survey of the bibliography on production, scientific management, motion study, industrial management and other matters, with the idea of discovering upon what scientific basis the present system rests. Or, at least, of finding out why it has gone forward for a century without any particular question as to its accuracy. Unfortunately, my search did not yield me anything.

I did find that the necessity for sub-dividing work and keeping one man at one specialized piece of work was accepted in practically all of these books and in practically all of the discussions, but I did not find that this acceptance was based upon any scientific consideration of the human necessities in the case or of the methods which might be advisable in order to secure the greatest effect from the human capacity.

Lest I should have omitted something or failed to gather in my search the arguments in the case, I applied to some of the present authorities who might be expected to afford an explanation of the reason for this system and its necessity. While the actual terms of the argument varied in the different cases and the language was changed according to the technical standard of the man, the argument which was presented to me, boiled down into the simplest terms, was about as follows:

> **It is easier to train a man for one job than for many jobs. There is a lot of time lost where a man must be transferred from one job to the other.**

The whole system of industry is built upon this consideration. The beautiful character of this argument will be seen at once. It is absolutely complete, just as complete as a circle and just as effective in getting anywhere. It can be transposed; you can begin at either end and arrive at the same place.

If you start off by saying that the system of industry is built upon the use of one man on one specialized piece of work and ask why, then you are told that it is because it is easier to train a man on one job and there is no lost time in moving from job to job.

You start at the other end and say that you wonder why it is easier to train one man on one job, the explanation is that the system of industry is built that way.

It is somewhat astonishing that the discussions of the technical societies and economists should have yielded so small a measure of consideration of the human side, when it is the human capacity after all which governs the productive capacity of the equipment. The argument which is advanced is so complete a criticism of the whole thought of scientific management that no further explanation will be needed in order to cause the thinking man to discard the whole subject and start afresh.

Some time ago, in these articles, in considering this question, mention was made of an experiment which had been conducted in England and which had been successful to some extent. Individual practice is always ahead of the general thought upon any subject, so far ahead that it is likely to be discounted or laughed at for a considerable time after it has been started, before the general comprehension begins to measure up to these individual cases.

In this question of one man-one job, a friend of mine who settled down to own a manufacturing business after having spent his younger days in roaming the world as a newspaper reporter, miner, explorer and an adventurer in a general way, has solved the question as far as his individual business is concerned, without any deep study into the general phases of the question and without any intimate knowledge of what the economist or the efficiency engineer thought, but with a considerable measure of human understanding and a very keen knowledge of the men with whom he is working.

He is engaged in the business of making and grinding chemicals for use in the process of several industries. One of the most important parts of his work is the pulverizing of the material. The pressure on the pulverizing mills is varied by the operator in accordance with the sound, and unless this is done carefully the results are disastrous to the material and to the mill.

On one set of pulverizing mills they have had for three years a man whose sensitiveness for sound made him particularly valuable. The material which was turned out under his care was more uniform and of more direct value to the industry they served than they have been able to

obtain from any other worker, and for three years no trouble of any kind had been experienced with this job.

One day the owner of this business received from his superintendent a letter saying that the pulverizing mills had been out of business for a couple of days, due to a mistake in the handling, and deliveries would be delayed. The rest of the story perhaps better be put as nearly as possible in the owner's words to me so as to convey his process of mind in arriving at the conclusion. He said:

"I knew very well the kind of a man that Tom was, and I knew also the kind of a job it was. I had a notion that sitting, listening to that sound all day would be very irritating to him and make it very difficult for him to come through with the right kind of work all the time, so I went out into the mill and had a talk with Tom. After we got to the point in the conversation where I thought he had gathered my understanding of the case, I turned to him and said:

" 'Tom, why did you smash that mill,' and Tom looked at me as though he was trying to find out what would happen to him if he told me the story, then he said in a shamefaced way:

> **" 'I don't know what was the matter with me that day but I just couldn't stand it, I wanted that damn noise to stop."**

The owner told me that he made up his mind on the spot what to do, and he said to this worker:

"Now listen, Tom, I don't blame you much; I guess I would have gone crazy listening to that sound all day myself, but you are going to take Bill from the packing room and train him to do it just as well as you can, and you and he will divide that job and his job in the packing room half day a piece, **so that whenever you are bothered with the noise you will be able to feel that you can quit it at the end of the half day and get a quiet job."**

From this beginning, this manufacturer finally carried the rotation of work, at least the change of work rather than rotation, all through his plant, so that to-day even the drivers of trucks take other work in combination with that and are relieved of this driving and steering a portion of the time. I asked him what the results were.

> **He said that the men had been far happier and far better at their work since they had had that relief.**

Of course an isolated instance of this kind does not indicate the general value, but it is encouraging to see any business man who is bold enough to experiment, and keen enough to understand, that the same feelings he has about a piece of work are subconsciously or consciously the same feelings which the worker has about that work, and has the ability to see that a contented, interested worker is capable of more satisfactory work in character and volume than one whose incentive has been lost by the irritation of the routine.

Our biggest trouble in industry at present is the fact that we have accepted as principles so many things which are nothing more than tradition and which have no sound scientific basis for their existence. The investigation which I have made into the history of industrial development indicates that my friend, the authority on scientific management, was quite correct when he said that it was easier to train a man on one job than on several jobs, and as far as I can see that is the *only* explanation of the one-man-one-job system. It was not a question of the efficiency of the man, but of the character of the supervisor and the difficulty of making an organization which was scientifically based upon the human necessities.

This, however, is no reason why it should be continued. There is a lot of knowledge of human necessities in the experience of every man who has come through the factory to the point of being manager or a head of the managing department.

> **The trouble is that he has either forgotten how he felt when he was working on the bench or at the machine, or he has not the courage to experiment with it or he thinks that it is part of the training which the men must undergo in order to escape from it.**

In a very few cases is the matter dealt with in the understanding that at least 75 per cent of the workers must remain on repetitive work all their lives and cannot escape by building themselves into supervisors. The workman is intelligent enough to know this. He has no belief in the fact that an army can be run with 200 generals and one private, but that the proportion is very much the other way, and he knows that for one foreman there will always be from 10 to 100 workers and for one manager there will always be from 100 to 10,000 workers.

We will only begin to understand the necessities of efficient production when we grasp the fact that for most of the men the work upon which they start in industry will be very much similar to the work on which they end, unless we arrange or organize so that the organization condition will provide the relief from that monotony and not leave it to the man's ambition to push himself through the crowd sufficiently to remove himself from its requirements.

It is true that it is easier to train a man at one job, but the very fact that it is easier to train him at that job indicates the probability that the interest which he has in the job will not be retained very long.

It is true that it costs a little time to move a man from one job to the other, but the time that this movement may cost may not be nearly as important as the time which is lost by the lack of incentive in the work which has already become so monotonous as to lose any possible mental interest.

It is true that the system of industry is built upon the one-man-one-job, but labor is getting scarcer, men are thoroughly dissatisfied with the present system, and their continuous demand for escape from the monotony in the way of shorter hours indicates that the present system is not worth a great deal as far as man satisfaction is concerned.

> **The traditional fact that the system is built that way should not have a deterring effect upon the investigation or analysis and upon a reasonable amount of experimentation aimed to find out the deficiencies of the present system and aimed at discouraging those deficiencies by the introduction of such changes as are required by the human necessities.**

We know a great deal more, because of the work of the doctors and the psychologists, about human necessities today than we did 100 years ago when this system was first started. It is about time that we used some of that knowledge in considering the system from an industrial standpoint. New ways of procuring efficiency must be found, because the present ways are not giving us any increased efficiency per man and the present demands of labor are not likely to give us that. These new ways will involve a great many changes, and one of the important matters for investigation is the effect of change of work as an incentive of interest and an incentive for concentration on the part of the worker.

The FORUM

French Experiments with Single and Dual Pneumatic Tires for Trucks

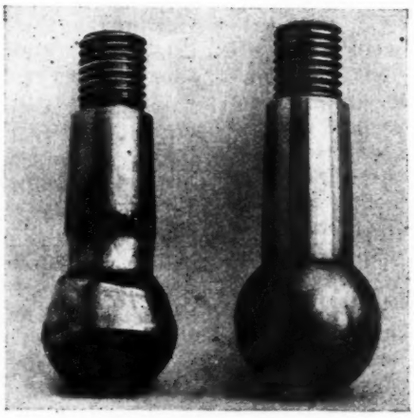
Editor AUTOMOTIVE INDUSTRIES:

EUROPE is displaying considerable interest in the use of pneumatic tires for heavy haulage, but this movement is not following the same lines as the corresponding one in America. In the first place, clincher tires are used exclusively, and previous to the time the American army came into France the straight-side tire had hardly been seen there.

The French practice, too, is toward the use of dual pneumatics in place of big singles. The biggest single tire made in France has a section of 155 mm. (practically 6 in.); 9, 10 and 12-in. tires are unknown. Dual pneumatics are only possible with the use of detachable rims or wheels. The latter are preferred in France, the leading maker being Michelin.

At present there are no heavy trucks in France designed specially to be equipped with pneumatic tires. During the war the heaviest load carried on pneumatics was 1½ tons, these vehicles being in the Air Service and employed for fast work. Several years ago the experiment was made of using pneumatic tires for the Paris motor buses, but tire manufacturers lacking experience in this particular field, the attempt never was followed up.

During the latter stages of the war the possibility of carrying heavier loads than 1½ tons on pneumatics was forced on the attention of makers and users by reason of the very frequent breakages of stub axles, wheel bearings, steering gear parts, etc., on solid tired trucks. For a full year there has been quite an epidemic of such breakages among trucks which have had three to four years' regular service on the hard macadam or granite paved roads of France. These breakages are not confined to any one make, showing that it is not a case of defective metal or poor construction. They do not occur on pneumatic tired vehicles, and they are rare on American trucks, which is not surprising in view of the fact that few of these latter have had more than one year's service in France. One French Army organization with 200 trucks in service has an average of two such breakages a day.



This picture shows abnormal wear of steering gear parts on truck fitted with solid rubber tires

Since the armistice, quite a large amount of experimental work has been done with solid tired trucks of 2½ to 3½-ton load capacity converted to dual pneumatics. Before the war came to a close a certain number of Pierce-Arrow 2-ton trucks had been converted by Michelin to run on 6-in. pneumatic tires, singles in fronts and duals at the rear. These vehicles were employed for sight-seeing purposes. With the return to peace conditions there was an immediate need of big capacity passenger-carrying automobiles to be used as feeders to the railroads, or for work in the devastated area where no railroads existed. No specially designed motor buses of this type were in existence, for whenever troops had been moved during the war use had been made of standard 3½-ton trucks on solid tires. The transportation companies therefore took ordinary army type 3½-ton trucks, such as the Renault, fitted passenger bodies on them and changed the wheel and tire equipment to Michelin disks and 6-in. pneumatics.

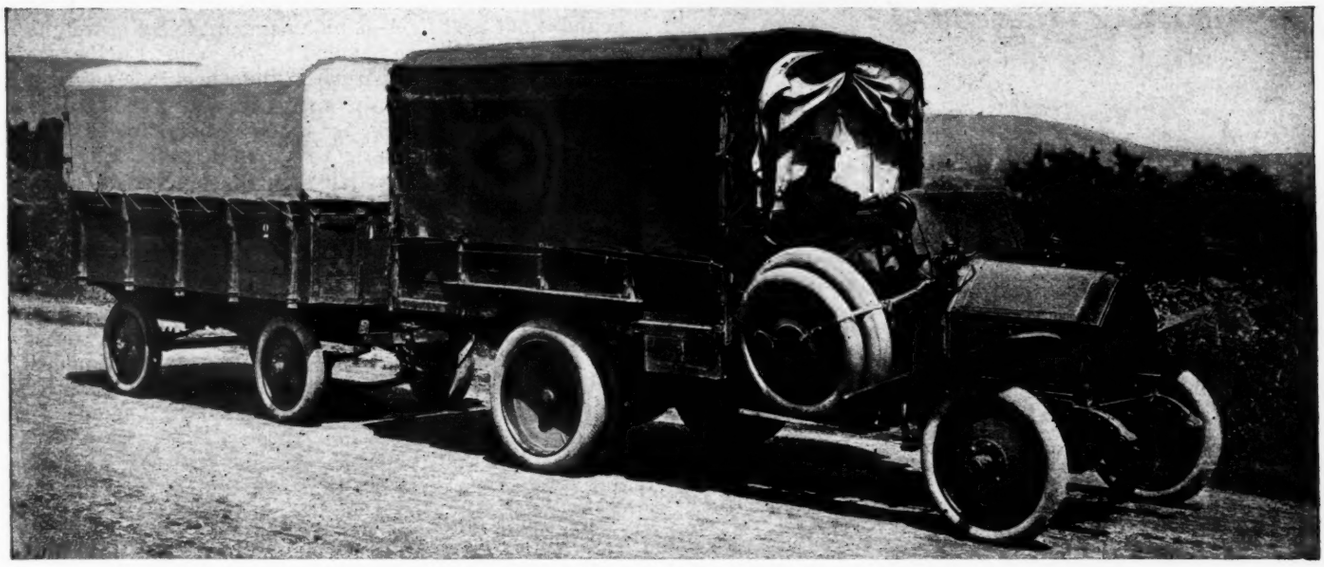
One important Paris transportation company, which had carried out a few experiments in this direction before the war, has now 100 trucks of 2½ tons load capacity running on dual pneumatics. This firm is convinced that for a load of 2½ tons the pneumatic tire is superior to the solid, because of the lower cost of maintenance, and the greater tonnage transported by reason of the higher average speed; in consequence it has abolished the use of solid tires. The experience of this firm is that with 6-in. dual tires on the rear and the same size single on the front the average tire life is 7500 miles on the front wheels and 5000 miles on the rear. There is every reason to believe that if these trucks had been designed in the first place for use with pneumatic tires the mileage would have been higher.

With a view to ascertaining the comparative advantages of solid and pneumatic tires for truck work, Michelin put a pair of 2½-ton trucks to work side by side, one of these trucks being on solid rubber tires and the other on 6-in. dual pneumatics. These tests lasted five months, during which time the solid-tired truck ran 6523 miles and the pneumatic-tired vehicle 9631 miles, and the tests were only brought to a close when the solid-tired truck became unfit for further service, a rear wheel being broken and the steering pivots very badly worn. The increased mileage, by reason of the higher average speed of the pneumatic-tired truck and the absence of visits to the repair shop, amounts to about 50 per cent.

On these comparative tests the solid-tired truck lost some of its cargo, by vibration and road shocks, on two or three occasions. The pneumatic truck never lost anything. The pneumatic-tired truck held to the road very much better than its rival. The latter had three accidents by reason of skidding, and on four occasions was unable to climb hills with a greasy surface. The pneumatic-tired truck had to come to the rescue four times and help the solid-tired vehicle out of difficult positions. On one occasion the solid-tired truck had to tow its companion through light snow for a distance of 18 miles.

The solid-tired truck was always very tiring to the driver. This difference was so pronounced that on long runs, of more than 100 miles, the driver on solids was obliged to stop for a rest, while his companion on pneumatics appeared to suffer no more fatigue than if he were driving a touring car. The following advantages in favor of pneumatics were noted as the outcome of these tests:

1. Lower cost of repairs and maintenance.
2. Increased tonnage transported by reason of the higher average speed.
3. Lower physical effort for the driver.



This Fiat 3-ton truck, equipped with dual pneumatic tires, hauls a trailer carrying 2 tons, making a useful load of 5 tons

4. Better performance on snow or heavy clay roads.
5. Truck less dependent on road surface.

Whether the pneumatic is more economical than the solid for ordinary haulage of 3-ton loads has not been fully demonstrated. It is obvious that reliable data on this point can only be obtained after comparative tests lasting a couple of years so as to take into consideration the value of increased mileage and all mechanical maintenance charges.

In the past this question has been studied from the standpoints of initial cost and tire maintenance costs only. No reliable comparative data exist on cost of total maintenance with solids and pneumatics, nor on earning capacity of solid and pneumatic equipped trucks. The progress which has been made in tire construction, however, with the advent of the big size pneumatic and the use of duals has brought about the possibility of the pneumatic becoming a direct competitor in a field which up to the present has been held exclusively by the solid.

Tire Makers Not Decided

Tire makers are not all certain that the pneumatic car competes with the solid for heavy haulage. The chief engineer of the leading Italian tire factory, manufacturing both solids and pneumatics, holds to the opinion that these fields will always be distinct. In France the opinion is growing that modern big-size pneumatics can compete with solids. Among tire manufacturers Michelin is convinced of the possibility of the pneumatic for heavy service, and after several years of practical tests is marketing tire equipment for useful loads of 2, 3 and 3½ tons.

One of the most important features of this development is the competition between the big single and the smaller dual. Reliable comparative data are not available. During the war there were built in America for the Air Service in France a number of 1½-ton trucks fitted with big single pneumatic tires. Later the dual idea prevailed and a certain number of practically similar trucks came into France with twin tires on the rear. No comparative data were obtained, however, for the war came to a close within a very short time of the arrival of the latter type of truck.

In France the practice is to use 5.3-in. (135-mm.) or 6-in. (155-mm.) tires as singles in front and duals on the rear wheels. With a load of 2800 lb. on the front axle and 5300 on the rear axle, 5.3-in. tires would be used, the pressure in the singles at the front being 70 lb. and 56 lb. in the duals at the rear.

Front Axle Load

With 6-in. section tires a front axle load of 5000 lb. can be carried with a pressure of 90 lb., and a rear axle load on the duals of 9700 lb., the pressure in this latter case being 85 lb. The determining factor in deciding between the 5.3 and the 6-in. tire is really the load on the front axle. With a front axle load of 2600 lb. the 5.3-in. section is sufficient; but when the weight on the front axle is increased to 3500 lb. it is recommended to fit 6-in. section tires and to have the same size in duals on the rear wheels.

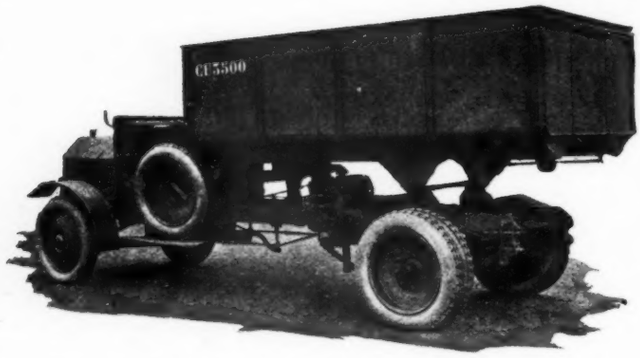
An interesting question to decide is whether two 6-in. tires should be used or a single tire of 12-in. section. In France the opinion is held that the former combination is better, although it is admitted that one 6-in. tire is better than a couple of 4 or 4½-in.

It is maintained that the 10 and 12-in. tire does not give any better riding qualities than a couple of 6 in., while it has the disadvantages of very high cost, great weight, and difficulty of fitting. It should be pointed out that in France only the soft bead tire is known, and that some of the difficulties of mounting would disappear with the use of the straight side. France, too, is convinced of the value of the detachable steel disk wheel, which has been through a very severe test in the war and has emerged with flying colors.

The initial cost of outfitting a truck is greater with the big singles than with dual pneumatics. Take as an example a 2½-ton truck weighing empty 2600 lb. on the front axle and 4600 at the rear and having a loaded weight of 3500 lb. front and 9300 lb. rear. Such a truck would be equipped with the uniform size dual combination of 38 by 6, or with the big single of 38 by 5½ front, 42 by 9 rear. The cost in each case is as follows:

Uniform Size Dual Combination

7 casings 38 x 6 (including one spare)	$661.00
7 tubes (including one spare)	112.00
Total	$773.00



Aries truck fitted with dual pneumatic tires and carrying a woeful load of 3½ tons

Big Single in Two Sizes

3 casings 38 x 5½ in. (including one spare)..	$374.00
3 tubes 38 x 5½ (including one spare).....	46.50
3 casings 42 x 9 in. (including one spare)....	882.00
3 tubes 42 x 9 in. (including one spare).....	132.50
Total	$1,435.00

Whatever the size of tire, it is always liable to premature destruction by nails, glass, metal, or contact with the sidewalk. As, in the case of a 9-in. tire, the load carried is almost twice that supported by any one of the tires in the 6-in. combination. The former is more likely to be affected by such contact. The premature loss of a 9-in. tire would be $294, while the loss of a 6-in. tire would be only $94.40, or three times less.

As to the Spare

An argument often quoted in favor of the dual is that only one size of tire is required, and only one spare wheel need be carried, whereas one of each size must be aboard the truck when the big single is used. From the standpoint of economy, all the advantage is with the dual, for the single spare casing and tube, size 38 by 6 (955 by 155 mm.), cost $110.40, whereas with the big single combination the expenditure is as follows:

1 casing 38 x 5½ in.	$124.60
1 tube	15.40
1 casing 42 x 9 in.	294.00
1 tube 42 x 9 in.	44.00
	$478.00

In other words, four times more capital is tied up in spares with the big single combination than with duals. The fact also has to be borne in mind that spare tires deteriorate when not in service and are difficult to carry. The risk under this heading represents on the one hand $110, and on the other $480—$140 for a front tire and $340 for the rear. As these two tires may have to be carried 6000 to 7000 miles before being brought into service, and as the difficulties of carrying them increase with the number, the disadvantage of the big single under this heading is great.

It is rather a serious matter when one of the big single tires punctures, for with a flat rear tire the vehicle assumes such an inclination as to be in an almost dangerous condition. When one tire of the dual combination becomes punctured the vehicle can easily be moved into an advantageous position on the roadside for changing; it is a very simple matter to fit the jack and raise the truck the fraction of an inch necessary to change the wheel, and, in extreme cases, the cargo could be dropped and the truck taken to a garage on one tire.

Any ordinary driver can change a 38 by 6-in. detachable steel disk wheel single handed for the weight is only 120 pounds; but a 42 by 9-in. on a demountable rim weighs 200 pounds and cannot be handled by one man. Further, to put this heavy rim into position on the wheel it is necessary to jack up a considerable distance. Whatever the type of tire adopted, a good jack is indispensable for all trucks equipped with pneumatic tires. In France, Michelin has provided for this by putting on the market an improved jack capable of lifting 4 tons to a height of 10 in. with very little effort. The dimensions of this jack are 9½ in. in height and diameter at the base 7 in. Weight is 15½ lb.

The main objection brought against dual tires is that stones are liable to lodge between the two casings and ruin both. There is no doubt that this is a real danger, for experience at the front showed that stones were picked up and wedged between the two rims so tightly that it was impossible to remove them without taking off, or slackening off, the outer of the two wheels. It was recognized on army service that the best way to prevent this was to have the two wheels so close together that it was impossible for stones to secure a permanent lodging place between the two rims.

Distance Between Tires

Comparative tests showed that of two different types of 1½-ton trucks the one with the wheels set so close together that there was only just sufficient space to prevent the walls chaffing was superior to the one with a space of ½ to 1 in. between the inflated tires.

Michelin, however, recommends that the distance should be so great between the two rims that no ordinary stone is likely to become wedged. The danger does not arise from stones getting in between the two tires, but from their wedging between the two rims and rubbing against the walls of the tires. If the stone is merely embedded between the two pliable walls of the tires it will be thrown out before much damage is done; it only becomes dangerous when it is locked in position between the unyielding rims. There is really no contradiction between these two methods of mounting; either the tires should be so close together that stones cannot get in, or they should be so wide apart that all ordinary stones found on the road will drop right through.

With the dual combination it is necessary to pay greater attention to inflation pressures than when only a single tire is used. In the latter case a lack of pressure in any tire is soon noticed, but when the load is distributed between two tires it is possible for one of them to have lost 50 per cent of its original pressure without the fact being apparent on casual observation.

With any of the ordinary tire pumps on the market it is a difficult, if not impossible, task to inflate beyond 90 lb. pressure. A 9-in. tire on a 2½-ton truck should be inflated to 120 lb. pressure, and to get this a mechanical pump is required. In France the preference is given to a steel bottle of compressed air, which is carried in any convenient position on the car and when empty can be exchanged for a full bottle at any garage throughout the country. Whilst no tires can be run under-inflated without deterioration, the question of adequate air pressure is more important on a heavy truck than on a light touring car.

Paris, Aug. 28. W. F. BRADLEY.

Frictional Losses in Straight and Spiral Bevel Gears

Editor AUTOMOTIVE INDUSTRIES:

WE are very anxious to get the very latest information on the actual and comparative friction of plain and spiral bevel gears. It occurred to us that you might

know of some publication giving recent information on this subject, or some published articles, either in your own or some other journal, to which to refer.

We believe there has been considerable experimental work done on this subject, but we cannot recall where we have seen such information published. M. B.

We do not fully understand what you mean by the friction of bevel gears, but presume that what you are interested in is the relative loss when power is transmitted through a pair of bevel gears. Tests of efficiency have repeatedly been made with straight bevel gears, but we have seen no figures for spiral bevel gears so far. We believe, however, that the difference would be so slight as to be unmeasurable with ordinary commercial testing apparatus.

It is not correct to say that a certain pair of bevel gears has a definite efficiency, the efficiency varying with the speed, the torque and the lubrication. Profs. C. M. Allen and F. W. Royce of the Worcester Polytechnic Institute have devised an apparatus for determining the efficiency of gear trains with relatively high accuracy, and they published results obtained with a Brown & Sharpe bevel gear set in a paper presented to the American Society of Mechanical Engineers in 1918. The gears were evidently an automobile set, of 14 and 52 teeth, 5 pitch, 1½-in. face, made from 5 per cent nickel steel. This set, when run with practically no lubrication at 1200 r.p.m. of the pinion, showed the following efficiencies at different horsepower inputs:

Hp. input	2.5	4	6	8	10	20
Efficiency	92	94.4	95.7	96.2	96.3	96.3

When lubricated with heavy oil and graphite the efficiency varied as follows:

Hp. input	2.5	4	6	8	10	15
Efficiency	94.5	96.7	97.7	98.2	98.5	99.0

These gears were mounted on ball bearings.

Some tests were also made on a bevel gear rear axle by the H. H. Franklin Manufacturing Co. about ten years ago. These showed a maximum in efficiency of 97 per cent, which at 1200 and 1500 r.p.m. of the pinion extended over quite a range of power output. At 1000 r.p.m. the efficiency went slightly over 95 per cent and at 800 r.p.m. it attained about 94 per cent.

In each case the efficiency obtained is the combined efficiency of the bevel gears and the two or more bearings, and it seems impossible experimentally to separate the gear loss from the bearing loss.—Editor.

Brakes Not Arrested by Hotchkiss Drive

Editor AUTOMOTIVE INDUSTRIES:

F. N. NUTT does not seem to have a clear understanding of brakes as regards the correct location of their levers. It is very easily shown that if all brake levers are correctly located there will be no absorption due to the sudden application of brakes, with Hotchkiss or any other kind of drive.

With the Hotchkiss drive, if these levers are not correctly located, in one case it would be made to absorb the sudden application of going ahead, but would necessarily grab going backward. In another case it would be made to grab going ahead and absorb sudden application going backward.

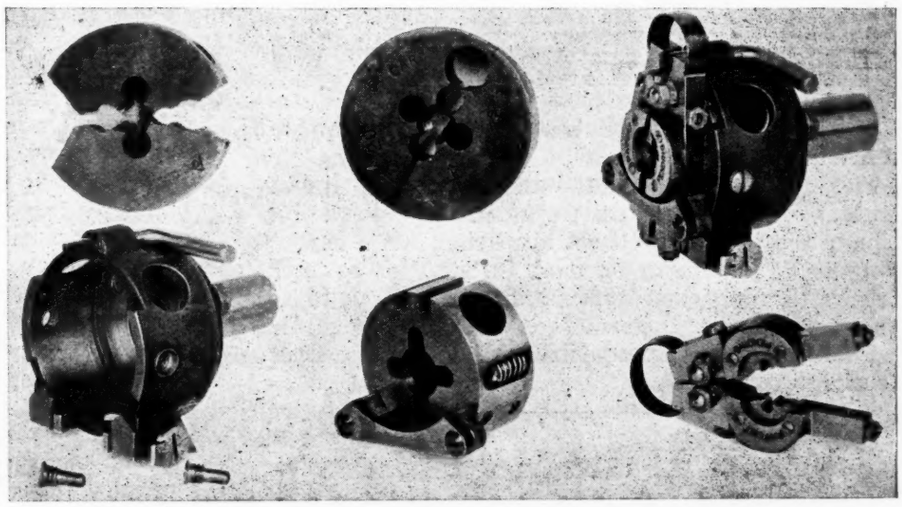
If I have not made this clear, will gladly give any further information upon request.—WALTER V. BAKER, Consulting Engineer, The Standard Parts Co.

A Self-Opening Die Holder

THIS die holder is said to combine the advantages of self-opening heads with those derived from the use of the solid button die. Being self-opening, it eliminates the slow backing up operation which is necessary with solid dies. The thread is cleared in the reverse operation, whereby the possibility of stripping or scoring is obviated.

An ordinary button die is used, split in halves, the die sections being firmly held in jaws and positively supported all around the circumference.

The parts are made of alloy steel, heat-treated and hardened. Before starting a thread, the die is closed by pressing a button on the top of the holder, or closed automatically by a lever device adapted to the turret of the machine on which it is used. The die holder is designed for use in turrets of hand and automatic screw machines, but may also be employed on a lathe.



Upper left hand corner—Split dies, which are made from standard button dies, as shown. Upper right hand corner—Die holder with die in place. Below—Three main parts and two screws of Federal self-opening die holder

Any thread which can be cut in a button die can be cut with this self-opening die holder and die. The die opens automatically when the travel on the turret ends, or at any point of the cut by stopping the turret slides. When the forward travel of the turret is interrupted, the rotation of the work draws the jaws ahead until they clear the jaw blocks, and open in response to the action of the springs. The die can be cleaned in 90 sec., it is claimed, without disturbing its adjustments. The holder is made by the Federal Products Corp.

AUTOMOTIVE INDUSTRIES
The Automobile

PUBLISHED WEEKLY

Vol. XLI Thursday, September 18, 1919 No. 12

THE CLASS JOURNAL COMPANY
Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, General Manager
U. P. C. Building, 239 West 39th Street, New York City

BUSINESS DEPARTMENT
Harry Tipper, Manager

EDITORIAL
David Beecroft, Directing Editor
Clyde Jennings, Managing Editor
P. M. Heldt

DETROIT OFFICE
J. Edward Schipper

WASHINGTON OFFICE
Allen Sinsheimer

BRANCH OFFICES
Chicago—Mallers Bldg., 59 East Madison St., Phone Randolph 6960
Detroit—95 Fort Street, West, Phone Main 1351
Cleveland—Guardian Bldg., Phone Main 1142
Philadelphia—Widener Bldg., Phone Walnut 5601

Cable Address - Autoland, New York
Long Distance Telephone - 8760 Bryant, New York

SUBSCRIPTION RATES

United States and Mexico - One Year, $3.00
Extra postage west of the Mississippi River on account of Zone Postage Law, 0.50
Canada - One Year, 5.00
Foreign Countries - One Year, 6.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order or Register your letter.

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; W. H. Taylor, Treasurer; A. C. Pearson, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.

Member of Associated Business Papers, Inc.

Member of the Audit Bureau of Circulations.

Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907, and The Horseless Age (semi-monthly) May, 1918.

AGAIN we are without a story of the German war trucks. Col. Slade, who has been writing this series, has been called to Washington for a conference as to the work in progress there in the examination of these trucks. It was his thought that he probably would be able to get more information as to the trucks through this examination, as well as to aid the work there. Regardless of the outcome of this mission, there will be additional articles on these trucks in future issues.

Where Haste Makes Loss

IF the Surplus Property Division of the War Department would allow a greater length of time to elapse between announcement of the sale of surplus property and the opening of bids, it would unquestionably obtain better prices. Announcements were made, for example, last week in Washington on Sept. 11, of the sale of steel bars and steel plates, bids for which would be opened by Sept. 16 and Sept. 17.

It is through the business magazines and not through daily newspapers that these sales receive most effective publicity and as business magazines are published weekly, semi-monthly or monthly, the sales cannot receive the proper advertisement. Fifteen to thirty days allowance of time following announcement of proposed sales would insure more bids and probably better bids.

High Labor Cost and Materials-Handling Machinery

ONE of the results of the present unrest in labor circles and the general increase in the wages of common labor will be an acceleration of the adoption of mechanical handling apparatus. Formerly, when a new structure of some magnitude was to be erected, a lot of laborers were set to work with pick and shovel on the excavation. To-day, in building construction, this primitive method has been largely superseded. The dirt is loosened by plows or other mechanical means, picked up by scoops and deposited on motor trucks which by means of hydraulic hoists dump it automatically on the dumping ground. Mechanical power is thus substituted for muscular power, and at a great saving.

In the shops there has been an equal transformation. At first heavy material, such as castings, were moved by hand trucks. For placing heavy castings in machine tools, where formerly the machine operator would call for the assistance of a number of fellow-employees, use is now made of chain and tackle or of over-head swinging arm cranes, and while this does not constitute a substitution of mechanical for muscular power, it renders the application of the latter much more efficient.

Electric industrial trucks have largely replaced hand operated trucks, because they are much faster and cheaper to operate. A further increase in efficiency has been effected by the introduction of industrial tractors and trailers, which, of course, can be used only where there is much material to be handled. Where one operator conducts a whole train of loaded trailers the labor item, of course, is lower than where he handles a truck without trailers.

In manufacturing establishments the gravity conveyer has proven a big boon. It conveys parts of all kinds from machine to machine, finally delivering them to the assembly line. In the assembling itself the machine under assembly is being moved along by mechanical power by means of a chain or traveling platform.

In each case the object is to minimize the amount of human energy expended in handling and moving the parts or material, thus obviating fatigue of the worker and enabling him to do more and better work. Formerly, where installations of mechanical handling machinery have been made, the advantage was generally so obvious that it was beyond question. Gradually a field is being approached where, owing to moderate weight of parts or for other reasons, the advantage of a mechanical installation is not so certain. The constant increase in the cost of labor will tend to widen the field of profitable use of material and parts handling and conveying machinery.

Parallel for Aviation Control

AN idea of the proportions of the control necessary for aviation in this country and throughout the world can be gained by a study of the interesting scheme for control of steam and sail navigation in this country. This control has been built gradually, as it became necessary by reasons of international relations, commerce and health to curb the tendencies of sailors to go from port to port at will, defying alike all customs for the benefit of mankind.

No one will say to-day that the steam and sail navigation regulations are unnecessary or that navigation is over regulated. No one would hand the control of the merchant marine over to the navy department, because it has control of our fleet, nor to the War Department because it knows more about transports than any other department of the government. Neither would such control be given over to the Health Bureau, nor the customs collectors.

But aviation is expected to come with a rush. It will develop much more quickly, according to all students of the situation, than did steam and sail navigation. The world is expectant and developments of this kind usually follow such expectancy.

There can be no question but that aerial navigation will demand greater supervisory activity than sea travel and will consequently call for the creation of a government organization able to handle more unsolved questions than the bureau of navigation. And since aerial navigation is but one phase of the work to be undertaken by a Department of Aeronautics, if such a department is established, it is quickly seen that no existing government department could include aeronautics within its duties without becoming an unwieldy body with one bureau outweighing the rest of the department.

Aeronautics enters into its place on this earth with unusual opportunity before it. It can embark directly upon a useful and important mission for humanity and without the mishaps that generally accompany inventions or discoveries. But to do this means that there must be prompt recognition of the similarity of aeronautics to both sea and land travel and immediate steps to study the similarities, with investigation of those unfortunate experiences already encountered on sea and land with a view to eliminating or preventing them from the outset in aviation.

For example there is the question of license and legal regulation. One city in Florida has already passed ordinances for the regulation of aircraft within its boundaries. Many of the rules are not only impossible but ridiculous.

And shortly, unless the proper steps are taken, we shall hear of States passing laws similar to the automobile laws so that instead of one Federal body of laws air pilots will find forty-eight separate and different sets of laws as confusing as the equal number of automobile laws.

Likewise, air and sea travel will be much alike. And we can profit both in saving of life and in speedy development of aviation if this fact is recognized and a Department of Aeronautics so created that it will have the power to act on the experiences of the various nations of the world in their efforts to regulate sea travel.

There will have to be laws for the regulation of signals, for the standardization of communication, for inspection of aircraft, for air-worthiness and safety appliances, for the supervision of landing fields so similar to the ocean and lake ports, and for numerous other factors that differ but little from sea travel.

And all of these laws and the establishment of a Department of Aeronautics are needed as soon as possible. The present situation, which not only makes for the possibility of individual State legislation and permits anyone who owns an airplanee to fly without license is intolerable and dangerous. A few more accidents similar to the recent dirigible crash in Chicago would perhaps delay the development of aviation for years—to the detriment of export trade, military and naval defense and the general prosperity and growth of this country.

There is urgent need for prompt Congressional action to save and promote American aviation—need for wise legislation at once.

Steel Strike Would Close Car Factories

Reserves Are Low and Few Makers Have Above 30-Day Supply

DETROIT, Sept. 15—Detroit automotive industries are wholly unprepared for a general steel strike, which, according to press reports, threatens to close the mills Sept. 22. If the strike materializes and lasts for more than 30 days fully 90 per cent of automotive manufacturers in the Detroit district will be brought to a standstill.

A canvass to-day reveals not a single company with sufficient steel for more than 60 days, the greater percentage of the concerns having less than a 30 days' supply on hand. Purchasing agents declare the industry is facing the most serious situation in its history.

Too Late to Stock Up

It is too late now to stock up and transportation facilities are so poor as to make immediate delivery impossible. There is no steel in reserve in Detroit. The warehouses are literally barren. This reserve stock has been practically depleted within the last 30 days by the Henry Ford interests, which placed big orders with all the Detroit jobbers. The steel operators here are doing their best to fill up their warehouses again.

Automotive companies, which in normal times contracted for their year's steel supply in January, delayed buying this year until May and June. The reason for this delay was that a price reduction was predicted when the government fixed a standard price schedule. The companies waited several months to get the advantage of this reduction and the majority of them waited several weeks more, hoping for a further price decrease if the railroad administration, which had protested against the price as set by the government and steel makers, won out in its efforts to bring prices down still further. It has only been within the last three months that the steel situation steadied down, and until that time few companies contracted for much steel in advance.

Unable to Stock in Advance

When the automotive industries did go on the steel market, other steel manufacturing lines followed and the rolling mills enjoyed such a rush of business as to make it hard for them to handle it. During the last four months the demand for steel has been greater than the supply. The mills have been unable to produce enough to keep a stock on hand. What they roll to-day, they ship to-morrow, and this has made it impossible for the automotive companies to stock up in advance.

The automobile manufacturer might be able to weather the strike if it lasted less than 60 days, but the parts maker is wholly unprepared and may be obliged to shut down. The parts maker is the one who is not covered. He has been buying from hand to mouth all this year, so to speak. When his scanty supply of steel is exhausted, his production must stop and, with the curtailment of the supply of parts, automobile and truck production also will stop.

Detroit manufacturers are carrying less steel to-day than they usually carried in ordinary times. It is customary for them to have a stock on hand that would last from three to six months. This year the firm with a three months' supply in its warehouse is considered lucky.

Effect of Strike on Future Business

Hudson, Ford and Dodge Brothers are the best protected of any of the Detroit firms. The General Motors units have a 60-day supply on hand. The majority of the other companies will exhaust their present stock within 30 or 60 days if unable to replenish it.

Makers here are trying to hurry deliveries and are buying every pound of steel available, but little hope is held, however, that increased deliveries will be forthcoming. Only a few mills have open tonnage for the balance of the year and no mill can be expected to roll a three or four months' supply within the next three weeks.

Even if the industry should pass through a serious steel strike without feeling an immediate production decrease, the strike will directly curtail future business. If the steel workers tie up that industry, automobile production is certain to be hard hit, even if the steel shortage does not cause the factories to stop work. The strike might not close the factories to-day, but it would cut production six months from to-day. Should the automotive manufacturer exhaust his supply before new steel arrives and fabrication work completed, he is certain to have a hard time to keep production normal.

Makers Hold Fate of Glidden Tour

NEW YORK, Sept. 16—Plans for the resumption of the Glidden tour for 1920 soon will be considered by a committee of the American Automobile Association which has been authorized to act upon the offer of Charles J. Glidden, donor of the trophy, to put it up for final disposition next year. The committee is composed of Richard Kennerdell, chairman of the Contest Board of the A. A. A., and Alfred Reeves, general manager, and S. A. Miles, chairman of the show committee of the National Automobile Chamber of Commerce.

Kennerdell announced to-day that decision concerning the race was dependent upon the attitude of manufacturers. If they are willing to enter cars in the proposed tour, which will be similar to those previously held, the road grind would be resumed. It would not be held again, he declared, unless the makers would support it.

The offer made by Glidden was that the cup would become the permanent property of the winner of next year's race.

Parts Makers Hold Credit Convention

Annual Meeting at Buffalo Draws Large Attendance—Plan Creditors' Committee

BUFFALO, N. Y., Sept. 13—The credit division of the Motor and Accessory Manufacturers' Association closed its third annual convention here to-day, having had an attendance representing the credit departments of more than 150 of the larger accessory firms of the United States. Problems of credit, as exemplified through the work of the individual member firms and of the association, were discussed at length through the two days of the business session.

The convention, as its chief work, considered the formation by the association of a creditors' committee and ratified the plan for such a body. It would be a permanent addition to the association and would assist member firms in adjusting the credit of purchasing companies. Full details of the plan were not worked out and were referred to the board of directors for action at a meeting to be held at New York on Sept. 19.

"Sane optimism is the predominant keynote among the leaders of the automotive industry to-day," was the manner in which Charles E. Thompson, the association president, summed up the work of the convention. This attitude was reflected in the discussions of each meeting.

"The automobile industry was never in healthier condition than it is to-day. The paramount problem before us is to maintain this health and to safeguard this prosperity. Optimism, of course, is desirable and warranted, but it is likely to prove a snare and a delusion unless it is built firmly on sound business principles and qualified by caution and prudence."

Addresses were made during the convention by R E. Hayslett, treasurer of the Hydraulic Pressed Steel Co., Cleveland; I. K. Schnaitter, assistant secretary-treasurer of the Willard Storage Battery Co.; H. A. Tongue, credit manager of the Firestone Tire & Rubber Co.; E. R. Ailes, treasurer of the Detroit Steel Products Co.; S. S. Meyers, general counsel for the association; E. B. Moran, manager of the credit interchange bureau of the National Association of Credit Men; Joseph A. Bower, vice-president of the Liberty National Bank of New York; J. M. McComb, assistant treasurer of the Crucible Steel Co. of America; F. R. Wilhelmy, assistant treasurer of the Standard Parts Co.; M. C. Dittmann, vice-president and general manager of the American Bronze Corp.; M. L. Heminway, general manager of the association, and C. A. Burrell, manager of the credit department of the association.

An informal association dinner was held on Thursday night and to-day was given over to a golf tournament and a trip to Niagara Falls.

Standards Work to Full Swing Again

Society of Automotive Engineers Announces Tentative Schedule —Steel Division Meets

NEW YORK, Sept. 17—Fall and winter activities of the Standards Committee of the Society of Automotive Engineers were under way here to-day, with the announcement of a tentative schedule of meetings, in conjunction with the first fall session of the Iron and Steel Division committee. Much work has been planned for the coming season and it was believed by officers of the society that many problems would come before the various divisions and sub-divisions.

The steel division held its meeting yesterday at the Engineers' Club, with F. P. Gilligan, secretary-treasurer of the Henry Southern Engineering Corp., Hartford, Conn., as chairman. Several proposed standards changes were considered that will be taken up further both by the division and by the Standards Committee as a whole. The meeting also was addressed by C. le Maistre of London, secretary of the British Engineering Standards Association.

Le Maistre has been in America, visiting both in the United States and in Canada, for several weeks in an endeavor to promote co-operation between standards bodies here and in his own country in such work. He outlined to the meeting what was being done and also told briefly that his organization, working in conjunction with the British Rubber Tire Manufacturers' Association, were preparing standards for tire and rim sizes. Such specifications, he hopes, may be made international.

Another activity announced to-day by the S. A. E. is the report of a sub-division of the Miscellaneous Division concerning the standardization of ball and socket joints, the report being based upon data obtained from various manufacturers. It will be presented to the next meeting of the Miscellaneous Division and, if adopted, to the full Standards Committee at its winter session.

Tentative dates for coming meetings were announced to-day as follows:

Sept. 25—Electrical Equipment Subdivision, New York-Pennsylvania section will meet at Philadelphia.
Sept. 26—Electrical Equipment Subdivision, Cleveland section, Cleveland.
Sept. 26—Electrical Equipment Subdivision, Detroit section, Detroit.
Oct. 3—Marine Section, New York.
Oct. 6—Truck Standards, Detroit.
Oct. 7—Engine, Detroit.
Oct. 7—Shaft Fittings, New York.
Oct. 9—Electric Equipment, Detroit.
Oct. 10—Lighting subdivision, Cleveland.
Oct. 13—Non-ferrous New York.
Oct. 21—Iron and Steel, New York-Buffalo section, will meet at Buffalo.
Oct. 23—Chain, New York.

FISHER BODY STOCK CLIMBING

DETROIT, Sept. 16—Fisher Body Corp. stock, which is now selling at 143½, has been the feature of the stock market during the past few days, climbing over 40 points in less than a week. This unusual jump is due to a semi-authentic report that a reorganization of that company is contemplated, calling for a new stock issue in which present stockholders will be allowed to participate. It is also reported that the Fisher Body Corp. has made all arrangements for the immediate construction of a large plant in Cleveland to handle the increasing business of that territory.

Louis Chevrolet Will Design for Monroe

INDIANAPOLIS, IND., Sept. 20—Louis Chevrolet, race driver and engineer, has become associated with the William Small Co. as consulting engineer. He will work out designing problems for the Monroe car, now being built by the William Small Co.

Chevrolet has been commissioned to build a fleet of racing Monroes to campaign in all the big events of the 1920 season, including the Indianapolis 500-mile race. The cars will meet the conditions of the Indianapolis race, 183 cu. in. piston displacement and a minimum weight of 1700 lb.

Chevrolet has been with the American Motors Co. of Plainfield, N. J., and with the Frontenac Motor Co. of Detroit.

Canadian Overland Cars Escape British Duty

TOLEDO, OHIO, Sept. 17—All Willys-Overland cars sold in Canada are being manufactured, not assembled, in that company's Canadian branch at Toronto. Practically all of the units going into the car are made of Canadian material. This course permits the Overland company to supply all British possessions with cars at a minimum export duty.

The Canadian plant, which, during the war devoted its entire resources to war work, is again back into peace production. Additional factory units are contemplated which will add 100,000 sq. ft. to the present plant. It now has a floor space of 280,000 sq. ft.

FREE ENGINEERING COURSE

NEW YORK, Sept. 18—A course in motor vehicle engineering will be given at Cooper Union this winter, beginning Oct. 1. It will include class-room work, and laboratory study of engines. No fee is charged for the course, the laboratory charge being $10. Those wishing to enroll should write for application blanks to the Secretary, Cooper Union, New York.

BUILDINGS FOR CLEVELAND TRACTOR

CLEVELAND, Sept. 9—The Cleveland Tractor Co. plans the construction of two additional buildings costing approximately $400,000. One building will be 182 x 440 ft., one story high, and will be used as an engine shop. The second building will be 90 x 190 ft., two stories in height, and will be used as a heat-treating plant. These two structures will give the company about 310,000 sq. ft. additional floor space.

Grand Prix de France To Be Held in August

Event Postponed From 1914 for 183 Cu. In. Cars, Cyclecar and Motorcycle Competition—Americans Invited

PARIS, Sept. 4 (*Staff Correspondence*)—The Grand Prix de France, organized by the Automobile Club of the West of France, under the control of the Automobile Club of France, will be held during the month of August, 1920. This event will be a road race for 183 cu. in. cars held over a fast course in the neighborhood of Le Mans. It is probable that there will be a second day's race for cyclecars and motorcycles.

These events were originally scheduled for the middle of August, 1914. A record entry had been obtained, there being 80 cars for the cyclecar and motorcycle class and 57 for the light car race. The events could not be run, owing to the declaration of war. It is the intention of the Western club to hold these races next year, and to make the big event a long-distance speed contest for 183 cu. in. racing machines.

The rules of the race have not been officially published, but will come out shortly. The automobile authorities at Le Mans are much interested in securing the participation of some of the American cars building for the Indianapolis race. These cars would comply with the French rules and, as the race will take place in August, there will be no difficulty in machines and drivers arriving in time.

Le Mans is a town of which thousands of the members of the American Expeditionary Forces have remembrance, for it was on the direct line of communication and had one of the largest of the American Army concentration depots in France. The district is highly agricultural and is the farming region of France in which the greatest number of automobiles are to be found. The town is also associated with the first flights of Wilbur Wright.

Whatever other nations may be absent from the next race, it is hoped that America will be represented.

HIGGINS CONTINUES PLANT

RACINE, WIS., Sept. 13—More complete details were given out here today concerning the recent transaction by which the newly-formed Continental Axle Co. of Elgerton, Wis., has taken over a part of the plant and equipment of the Higgins Spring & Axle Co. of this city.

The Continental company, it was revealed, has taken over the machinery and stock of the department of the Higgins company in which is carried on the manufacture of axles for motor trucks, tractors and trailers. Earlier reports were to the effect that the entire business of the Higgins company had been absorbed. However, the company will continue to make springs of all kinds and axles for horsedrawn vehicles.

Detroit Suffers But Little From Strikes

Labor Difficulties Due To Walkouts Are Few—Shortage Large

DETROIT, Sept. 15—Officially there are several strikes on in Detroit. Unofficially, there are none, for all of the plants supposed to be in controversies with their workers are running at full force and nearing maximum production. The strikes simply petered out. Although not declared off by the unions, the men in nearly every instance have returned to work or new workers have been placed in the jobs of those who walked out.

A general foundry strike has been in progress here five months. However, all of the Detroit foundries are running full force. For a while the strike curtailed production severely, but, as the employers remained firm, the unionists gradually returned. The foundry workers supposed to be on strike but who have returned to work in the various foundries have now formulated new demands in which $1 an hour is asked as a minimum wage. A new strike is threatened if the pay increase is not granted.

"No More Men Wanted" at Timken.

At the Timken-Detroit Axle Co. the only evidence of labor trouble to-day was four pickets who walked their beats with signs on their backs. This plant has a full force at work. At the employment office door is the sign "No more men wanted." The L. A. Young Industries trouble petered out the same way, the men slowly returning to their jobs.

A few pickets are still on the job at the Wadsworth Manufacturing Co. This company had a $1,000,000 fire recently that destroyed its finishing department, but the woodworking departments were saved. This has cut Wadsworth production and what men were needed in the woodworking departments were recruited from the departments put out of business because of the fire.

The McCord Manufacturing Co. experienced slight trouble two weeks ago. It could not be termed a strike inasmuch as it affected but a few departments and was settled in three days. The Wilson Body Co. is another plant in which slight trouble has taken place recently. Here, like the McCord company, only two or three departments were affected and the trouble was quickly remedied. The Bay City plant of the Wilson company, however, was tied up for some time by a strike. Production there is now on the increase, despite the fact that the strike is supposed to be still in progress.

Some of the sheet metal workers are out through the failure of the employers to grant a minimum scale of $1 an hour. Less than 100 men are involved, however, and production has not been curtailed in the least.

Detroit employers declare the labor situation here was never better, as far as labor contentment is concerned. The automotive industry is now paying the highest wages of its history, the scale in many plants exceeding that of war days.

There is no labor surplus in Detroit; in fact the plants here could use thousands of men if suitable housing facilities were available. There is a shortage of common labor in every line of work. Common labor wage scales range from 50 to 60 cents per hour in most of the plants, while the building trades are paying as high as 75 cents per hour for carpenters' helpers and ditch diggers.

There is a shortage of skilled mechanics, machinists and tool makers. This, however, is not unusual, inasmuch as this shortage has prevailed for three or four years.

Labor Shortage Due to Emigration

The common labor shortage is due to the heavy exodus of foreign-born workers who are returning to Europe, the bars on emigration raised by most of the European countries and the fact that but little negro help is coming from the South. The Southern states are paying better wages to the negro and he seems more content to remain there.

The war has spoiled a big portion of Detroit's common labor. When skilled men could not be obtained, laborers were placed at lathes and drill presses and at scores of other jobs formerly held by skilled men. While they mastered their more skilled trades in a fair manner, they are not expert enough to continue in such positions. These men have had a taste of skilled work with its better wage scales and will not return to the common labor occupations. Hundreds of them are now drifting from one job to another, staying but a short time in each place. This is one of the factors in the excessive labor turn-over situation here.

Turn-over in the plants, however, is showing considerable improvement. It is less than half what it was three months ago, averaging from 10 to 15 per cent in most of the factories. During the war and in the months just following the armistice, the turn-over ranged from 15 to 22 per cent.

Ask for Separate Car and Truck Registration

NEW YORK, Sept. 13—A campaign will be instituted soon by the National Automobile Chamber of Commerce for the purpose of having the registration bureaus of the various states separate, in their totals, the registrations of cars and trucks. For some years the automotive industry has been seeking figures to show the total numbers of each of these two types in use in this country. So far, only twenty states have separated the two types, the others making their totals include both under the one heading of automobiles.

Specific requests will be made to each state bureau to separate these lists, and various organizations, as well as manufacturing and selling concerns, will be asked to bring pressure upon the state authorities for these figures.

Detroit Calls for More Closed Cars

Show Planned for Early October —Demand Higher for This Model

DETROIT, Sept. 15—The Detroit Automobile Dealers' Association is now making preparations for staging its first closed car salon. It will be held at the Arena Garden, Oct. 6 to 11. Only closed models will be exhibited.

Twenty-five Detroit dealers and distributers have reserved space, while a number of others have signified their intention of exhibiting cars if their factories can supply them with closed models. The greatest handicap is the uncertainty of the dealers in securing closed cars in time for the event. Dealers representing factories in Detroit are fairly confident of securing suitable models, but those representing companies in other states are very uncertain.

In the Detroit district, dealers unanimously declare that fully 50 per cent of their customers prefer closed cars to the open models. Inasmuch as closed car production represents less than 30 per cent of the output, there is a great shortage of this line and few dealers are able to make closed car deliveries within 60 or 90 days. Every dealer has a long waiting list and scores of buyers who prefer the closed machine are becoming tired of waiting and are purchasing the open car instead.

For instance, at the Haynes-Detroit Co., local distributer of the Haynes car, four sales were recorded one day last week. Three of the purchasers selected open models, while one, willing to wait two months for his delivery, bought a sedan. Had closed cars been available for delivery within 30 days, two of the men who bought the open cars would have taken the closed model, the salesman states.

At the Paige sales and service company seventy prospective buyers have been on the books for closed models since spring. Twenty of these have purchased open touring models, while fifty are still waiting for the Paige closed series, due to appear Oct. 1.

Although the Buick company has been in production on its closed line for several weeks, not a single delivery has been made in the Detroit territory to date.

Detroit dealers are urging their factories to increase closed car production. They believe that at least 50 per cent of production should be closed jobs. Many of the Detroit factories are planning big production increases in their closed lines to meet with the unexpected demand for this type of car, but it will be some time before these are coming through in sufficient numbers to satisfy the existing demand. Although closed car production is about 25 per cent of the total output, the factories are having great difficulty in maintaining this schedule, due to a pronounced shortage of closed car bodies.

Freight Car Tie-Up Causes Drive-Aways

Makers Urge Dealers to Obtain Cars at Factory—Such Deliveries Large

DETROIT, Sept. 15—Detroit automobile and truck manufacturers are urging their dealers to drive away their cars. This is due to the inability to obtain sufficient freight cars, the shortage of which is becoming more and more pronounced. While Toledo and Cleveland plants are encountering the same transportation difficulties, car shortage is not as pronounced there as at Detroit.

During the last two months, hundreds of machines have been driven away, some of them going as far west as Arizona and New Mexico. Cars are being driven to practically every Eastern and Southern state. A large number of Ohio, Indiana and Illinois dealers are obtaining prompt delivery by coming to the factories and getting their cars.

Responsibility of Crop Movement

Local railway freight officials say the scarcity of freight cars is due to the heavy crop movement in the West. They also say that, under government management, rolling stock that has been scrapped has not been replaced. They are thus inclined to blame the railroad administration for the shortage.

The policy of the automobile manufacturers, since the signing of the armistice, has been to discourage drive-aways. The repairs necessary to offset the road wear on drive-away cars eats into the profits and it is often necessary to refinish the car, especially if rainy weather and muddy roads were encountered.

However, the freight car shortage is forcing a reversion to the war-time drive-away policy. During the last two months, approximately 50 per cent of all Hupmobile deliveries have been drive-aways. The Columbia Motor Car Co. has sent cars overland as far west as Tulsa, Okla., and on one occasion two cars were driven to San Francisco. The Paige-Detroit Motor Car Co. cannot get freight cars and is shipping overland.

Largest Hudson Drive-Away

Recently the Hudson Motor Car Co. staged the largest drive-away in its history, when 150 cars were driven from the factory by the Hudson Motor Car Co. of Illinois. On the same day, the Walter Bemb Motor Car Co., Detroit distributer for the Hudson and Essex lines, drove 100 cars to various parts of Michigan. The Hudson company is shipping a large number of machines on flat cars after securely boxing them in. This company has also sent cars overland to San Francisco, while its Atlanta, Ga., distributer has negotiated several drive-aways this year. The Buick Motor Car Co. and Dort Motor Car Co., Flint, Mich., are also making many deliveries via the drive-away plan.

Before the threatened general railroad strike, dealers became more impatient for immediate deliveries and, although some freight cars were available, they decided to take no chances on a general railroad tie-up. They came to Detroit with drivers and mechanics and plunged into the drive-away work. This is another reason for the recent increases of drive-aways.

Consider Standards For Screw Threads

NEW YORK, Sept. 15—Efforts to formulate screw thread standards and practices, as applied to the automotive industry, were under way by the Society of Automotive Engineers as the result of a meeting held here last week at which the first steps were taken looking to this end. This work was being done in conjunction with the National Screw Thread Commission recently created by Congress.

The national commission is constituted of nine members, representing the Bureau of Standards, the Army, the Navy, the American Society of Mechanical Engineers and the automotive society. The meeting here was for the purpose of obtaining co-operation from automobile manufacturers for the work of the national body. Attempts will be made to gather definite information concerning present shop practices in this respect from as many manufacturers as possible, as it was stated there was yet opportunity for much advancement in this knowledge.

The committee appointed by the S. A. E. for this work consists of Paul W. Abbott, of the Lincoln Motor Co.; R. P. Smith, of the Packard Motor Car Co.; Lyle K. Snell, of the Willys-Overland Co.; Alexander Taub, of the General Motors Co., and W. K. Jamison, of the Domestic Engineering Co.

The meeting was attended, in addition to President Charles M. Manly of the Society, by the following:

Morris Thomson, Timken Detroit Axle Co.; Paul W. Abbott, Lincoln Motor Co.; Lyle K. Snell, Willys-Overland Co.; R. P. Smith, Packard Motor Car Co.; W. A. Davidson, The Singer Mfg. Co.; Alexander Taub, General Motors Co.; William Beckman, Duesenberg Motors Co.; Calvin W. Rice, Secretary, American Society of Mechanical Engineers; E. H. Ehrman, Chicago Screw Co.; W. R. Porter, S. S. White Dental Mfg. Co.; C. M. Pond, Pratt & Whitney Co.; A. W. Erdman, Pratt & Whitney Co.; E. C. Peck, Lieut.-Col., Ordnance Department, U. S. A.; Earle Buckingham, Pratt & Whitney Co., and Niles, Bement & Pond; B. H. Blood, Pratt & Whitney Co.; L. A. Fischer, Bureau of Standards; J. B. Thomas, Westinghouse Electric & Mfg. Co.; W. K. Jamison, The Domestic Engineering Co.; L. P. Kalb, Standard Parts Co.; E. Burdsall, Russell, Burdsall & Ward Bolt and Nut Co.; C. F. Clarkson, General Manager, Society of Automotive Engineers, and R. S. Burnett, Standards Manager, Society of Automotive Engineers.

GOVERNMENT MOTOR EXHIBIT

NEW YORK, Sept. 13—Provisions have been made by the National Automobile Chamber of Commerce, according to announcement here to-day, so that interested persons in the automotive industry may visit the automotive exhibition at the government arsenal at Rock Island, Ill. This exhibit is said to show, in a complete manner, the automotive equipment used by this country during the world war.

Production Planned of 500 Cars Daily

Expansion Plans Announced for Duesenberg Unit of Willys Corporation

NEW YORK, Sept. 13—Enlargement of the plant of the Duesenberg Motors Corp., at Elizabeth, N. J., to six times its present size for the proposed manufacture of the new Willys Six to be marketed by the newly-formed Willys Corp., was forecasted here to-day by a brief announcement of the building plans. The present plant, with a floor space of about 200,000 sq. ft., will be so enlarged that, by March 1, 1920, all of its units will measure approximately 1,200,000 sq. ft.

The announcement set forth that practically a complete manufacturing plant for cars would be constructed so that early next year a daily production of from 400 to 500 machines might be reached in the new plant. Complete units for the construction of almost all parts of the proposed car will be built at Elizabeth, although it was admitted that many parts and accessories would have to be obtained from outside sources.

The Elizabeth plant will be known, it was said, as the Duesenberg unit of the Willys Corp. The other large units will be the New Process Gear Corp., at Syracuse, N. Y., and the Electric Auto-Lite Corp., at Toledo. The gear company will make transmissions, axles and similar parts for the Willys car, while the Toledo concern will supply the electrical equipment. From the information obtained, no further enlargement of these two plants, aside from previously announced plans, now was under contemplation.

The present Duesenberg plant is located on a tract of land about twelve acres in extent. Purchase of additional property has brought this up to some thirty-five acres. Work has started on razing the present buildings on much of this added plot and the construction work of the new plant units will be under way soon, it was announced.

Full details of the proposed construction were not made public. However, it was stated that all buildings would be of concrete and steel and that the main structure would be a four-story building 1400 ft. in length.

Present business of the Duesenberg plant will be continued, it was said.

SERVICE MEN MEET IN OCTOBER

NEW YORK, Sept. 15—Discussions of service problems will form the program for the meeting of factory service managers, under the direction of the National Automobile Chamber of Commerce, to be held, probably at Detroit, the week of Oct. 27. Determination of the date has just been announced by the Automobile Chamber. Organization of service associations throughout the country was stopped during the war and it was hoped that the October meeting might serve to revive the plan.

Wisconsin Exhibition Rivals Winter Show

New Models Are Displayed and Results Large—In Conjunction With Fair

MILWAUKEE, Sept. 13—The annual fall show of the Milwaukee Automobile Dealers, Inc., held in conjunction with the Wisconsin State Fair, at West Allis, near here, closed to-day as the most successful exhibition of its kind yet held.

For more than six months Wisconsin, like many other states, has demanded twice as many cars as could be obtained. That this was true was proved by the call for cars, as evidenced by the showing just closed, from consumers and dealers alike. If price entered as a consideration in the clamor for sales at this show it was not apparent.

This year's State Fair show, which is the real Wisconsin show of the year, as distinguished from the big winter show in the downtown Auditorium, was one of the most important features of a great agricultural exposition. Like the winter show, the fall show is managed and conducted directly by the Milwaukee Automobile Dealers, Inc., which leases the big Motor Hall and necessary adjoining space for temporary structures to accommodate the overflow from the state fair management. The M. A. D. charges a nominal admission fee of 10 cents to the motor building.

Cars Shown in Motor Hall

In Motor Hall, and the annex consisting of a huge circus tent required to relieve the congestion, all passenger and commercial car exhibits are concentrated. The third important element of the automotive industries, the tractor, is accommodated separately, in connection with the congregation of farm implement and power machinery exhibits a short distance away. Motor Hall and the canvas annex contained exhibits presenting fifty-eight makes of passenger cars, thirty-six makes of commercial vehicles, two makes of trailers, and sixty-five displays by as many different distributers and dealers in automotive equipment. The permanent building is 150 x 350 ft. in size, fireproof, and the tented annex had an area of 100 x 250 ft., giving a total floor space of 77,500 sq. ft., virtually crammed with exhibits. In the six days that the show was open to the public, more than 185,000 people entered it.

The show just closing attracted many more of the big men of the industry than usual, making it equal to the mid-winter show in this respect and in the holding of conferences with dealers by distributers, who thus take advantage of the general "round-up" of their retail representatives in Wisconsin and northern Michigan. The principal event of this character was the dinner given by the Nash Sales Co., wholesale distributer of the Nash line, for its 300 or more dealers and subdealers. Charles W. Nash, president of the big Kenosha industry, was present and told about the establishment of a new Nash factory in Milwaukee to produce four-cylinder passenger cars at the rate of 100 a day by March 1, 1920. The Overland Wisconsin Co., Milwaukee; Wisconsin Oakland Co., March Motors Co., Mitchell distributer; Ford Motor Co. and several other large wholesalers also entertained dealers at dinners, followed by trade conferences.

The feature of the truck sales effort was a big "Ship by Truck" demonstration arranged by the M. A. D. and held Thursday afternoon. Approximately 200 trucks were marshalled for a parade which traversed the downtown streets shortly after noon and then proceeded to the state fair grounds at West Allis, where the procession passed in review before the governor and other notables.

Interest in New Models

New offerings of several factories drew wide interest. These included the new Overland Four, the Cleveland Six, and a new design emanating from General Motors and called the Samson nine-passenger carryall. This car will list at $750 and will be made at the General Motors works at Janesville, Wis., through the Samson tractor division.

Another of the General Motors products to make its first showing at Milwaukee is the Sunnyhome Electric Light & Power plant, of the Sunnyhome Electric Co., at Detroit, a division of the General Motors Corp. This outfit is a complete little power plant which is housed in its own power house in the farmer's yard. It is 110-volt, with automatic control.

Another electric plant to make its first public appearance is the Willys, one of the products of John N. Willys. This was exhibited in a special building which represented a farm cottage, completely electrified.

General Motors also exhibited a new ¾-ton and 1¼-ton truck, and the Samson "Iron Horse," a combination tractor design, in addition to the Model M Samson tractor already in quantity production at Janesville. The carryall, trucks, "Iron Horse" and tractor all bear the Samson trademark and will issue from the new Janesville works.

General Demand Healthy

W. C. Durant, president of General Motors, and a party of executive associates visited the fair several days. The party included: W. C. Sills, general sales manager, Chevrolet, and J. A. Craig, president; W. L. Clark, general sales manager; H. M. Craig and C. C. Clay, assistant sales managers, Samson.

At the close of the show Milwaukee distributers believed that the 1919 passenger car market of Wisconsin and upper Michigan was about 50 per cent satisfied up to Sept. 1. Wisconsin's registration up to that date was 244,500 cars, which is 54,000 more than were registered throughout 1918. This does not include motor trucks and represents only cars in private owners' hands. While the absorption of 54.000 cars was considered a remarkable achievement for Wisconsin, the consensus of opinion was that 100,000 cars could be marketed in this state this year if the factories could furnish them.

Discussions at the show revealed that the demand for trucks was healthy in all sections of the state and that farmers were manifesting more and more interest. The tractor situation was regarded as satisfactory and the outlook excellent. The big tractor selling season is now opening, with fall plowing just beginning.

Car Theft Bill Passed by House

WASHINGTON, Sept. 16—The Dyer motor theft law, making it a felony to take stolen motor cars from one state to another, which was adopted by the House by a vote of 200 to 40, has been sent to the Senate, where its passage is expected within two weeks. The House action came after conferences between Representative Dyer of Missouri, who introduced the bill, and Harry G. Moock and C. A. Vane, general manager and assistant general manager of the National Automobile Dealers' Association. Changes were made in the bill then, making the punishment for violation a maximum fine of $5,000 and imprisonment of not more than five years instead of ten years as it was at first. This was changed because of opposition that had arisen among some Congressmen. The bill was passed under a special rule. Dyer will appear soon before the Senate Judiciary Committee in an effort to hasten its adoption by the upper House.

EVANSVILLE TRACTOR DEMONSTRATION

EVANSVILLE, IND., Sept. 15—The Central States Tractor Sales Show is scheduled to be held here Oct. 14-17, at the same time as the Evansville Centennial Exposition and the 1919 aviation meet of the Evansville Aero Club.

The show is to be held at Garvin Park, Evansville, and 1000 acres of land in nearby fields are to be laid out for demonstrations of the machines. W. R. Heilman, associated with national demonstrations in the last few years, is in charge of the Evansville show, and co-operation has been promised by the heads of the farm mechanics departments of the state universities of Purdue, Ohio, Kentucky and Missouri.

SALES OF SURPLUS MATERIAL

WASHINGTON, Sept. 15—Sales of surplus material in the United States by the War Department, including machine tools and other equipment, will be made only for cash or equivalent, with the purchaser supplying transportation, according to a ruling made to-day by the War Department.

NEW DEPARTURE FIELD DAY

BRISTOL, CONN., Sept. 16—The annual field day and sheep barbecue of the New Departure Manufacturing Co. here, with which is combined a plant inspection and business meetings, will be held the last three days of this week.

British Car Makers Protest Free Import

No Change Expected However, As Present Plan Holds Until Spring

LONDON, Sept. 5 (*Special Correspondence*)—British motor car manufacturers are voicing strong protests against the freeing of motor car imports from America, this ban having been lifted Sept. 1, according to the American Chamber of Commerce here. This body has been occupied in obtaining concessions for its members throughout the period of British import restrictions. The makers of the more expensive British cars are not expected to suffer, as it is the manufacturer of the smaller car whom the American competition will affect.

British Manufacturers Want Clear Field

The manufacturers claim that they have not yet been given sufficient time to re-establish their home market after four years' concentration on Government orders of all kinds, and, with the removal of the import restrictions, the American manufacturer will be in the British market before the British manufacturer is ready. Many plants producing shells and fuses during the war are reported now to have been converted for producing cheap cars, but they will not have a chance to get going or to get the benefit of experience in this line of production with which they are unfamiliar, before America sweeps the market. These are the complaints one hears.

On the other hand, the American Chamber points out that the Government has given the British manufacturer good protection all along by limiting imports of American cars to 50 per cent of 1913 imports up to Sept. 1, despite which there is no getting away from the point that at the moment British production is insufficient to meet the demand for motor vehicles, particularly for commercial use. This is a demand of which the Government must take cognizance. The market must be fairly supplied.

High Cost Will Limit Imports

Although it is evident that many of the manufacturers would like to resume imposition of the restrictions on American cars, the American Chamber of Commerce does not anticipate that the Government will take any such steps. The present import duty of 33⅓ per cent, c.i.f., will remain until the end of the fiscal year next spring, and may be revoked at that time by Parliament, if desired. This duty, in addition to the abnormally low value of the pound sterling in dollars at the present time will make the purchase of even low-priced American cars a comparatively expensive item in Great Britain.

One prospective importer reckoned up the loss on exchange, the import duty, the insurance and the present high freights, and changed his mind. He figured it would cost him almost 100 per cent over the price of the car in the United States. Such a situation should prove enough of a deterrent on imports to protect the British manufacturer within reasonable limits if he can only show some sign of producing British cars in a quantity and at a price somewhere approximating the demand of a public eager to buy.

Demountable Rims and Self Starters for Fords

DETROIT, Sept. 18—The Ford Motor Co. is equipping its sedans and coupes with self-starters and demountable rims as part of the standard equipment, and has raised the price of these two models $100 to cover the cost of the two additional units. The Ford sedan is selling at $875 and the coupe at $750. On the touring car and the roadster the self-starter and demountable rims are optional.

Without the extra equipment the price of the latter two lines remains the same, $525 for the touring and $500 for the roadster. A few of the touring cars are equipped with the self-starter and are selling at $600. For the self-starter $75 additional is charged while if demountable rims are added, $25 more is asked.

WATSON TO MAKE TRUCKS

CANASTOTA, N. Y., Sept. 18—A new line of motor trucks to be made by the Watson Products Corp. will be put on the market within the next few months. Plans were completed over a year ago, but manufacture was postponed because of the war.

Exact features and specifications have not yet been given out, but it is understood that the plans call for a ¾-ton, 1½-ton, 2½-ton and 3½-ton model.

The Watson Products Corp. is the new name of the old Watson Wagon Co., which was started thirty-one years ago to make heavy hauling wagons. On July 1, of this year, the name was changed to the Watson Products Corp. and the capital increased from $600,000 to $1 000,000. The company has also bought several concerns in its vicinity to increase its factory facilities preparatory to the launching of its trucks.

DODGE EXPANSION PROBABLE

MOUNT CLEMENS, MICH., Sept. 18—Probable expansion of the Dodge Bros. automobile factories in this city is intimated by the purchase of several farms bordering Selfridge field. No definite announcement has been made by the corporation.

MOTOR PATENTS CORPORATION

NEW YORK, Sept. 15—The Entz Motor Patents Corp. has been formed by the consolidation of the Entz Motor Patents Corp. and the Owen Magneto Motor Car Corp., with a capital of $1,200,000. Incorporators are: D. C. Durland, Racine, Wis.; G. F. Morrison and R. H. Swartwout.

All Ford Stock Held By Family Is Report

Rumor That Couzens Holdings Have Been Bought By Ford for $30,000,000 Denied

DETROIT, Sept. 15—The rumor that James Couzens has sold his complete holdings of stock in the Ford Motor Co., while only partially confirmed, is substantiated by other indications to an extent that makes it almost certain that some transaction of the sort has been accomplished.

With the possession of the Couzens stock, the whole of the Ford interests will be in the hands of Henry Ford and his family. When, in July, the Ford family bought out the Dodge brothers, John W. Anderson and five other minority stockholders, it acquired the entire issue of 20,000 shares except the 2180 owned by Couzens. The July transaction was at the rate of $12,500 per share, and if the figure of $30,000,000, which, it is rumored, was the amount involved in the Couzens purchase, is correct, Couzens made about $1,250 per share by not closing at the July figure.

It is doubtful that the acquisition of complete ownership by the Fords will make any change in the Ford policy, because the July purchase secured complete control.

Denial of the purchase has been made from Henry Ford's office.

7500 MAIBOHMS IN 1920

SANDUSKY, OHIO, Sept. 16—The Maibohm Motors Company proposes to build 7500 cars in 1920. This is on a daily production schedule of 25 cars, which is well within the capacity of the new factory. The new plant, 620 ft. long and which includes the Maibohm body plant, is now practically completed. Installation of machinery is well under way.

FOREIGN EXCHANGE RATES LOW

WASHINGTON, Sept. 15—Exchange rates as announced by the Treasury for September are below corresponding rates for August. The new rates are as follows: pounds sterling, $4.21 each; French francs, 8.05 per dollar; Belgium francs, 8.35 per dollar; lire, 9.55 per dollar.

Financial officers are obliged to keep their balances of European funds as small as possible in order to minimize losses due to falling exchanges. A recent sale of 3,000,000 Swiss francs for $528,625, as compared with a normal value of about $579,150, illustrates the losses incident to transactions even in the money of neutrals.

BELDING FOUNDRY IN OPERATION

BELDING, MICH., Sept. 16—The Belding Foundry & Machine Co. has been placed in operation by the Grand Rapids Brass Co., which has controlled the property for a number of years. The Belding plant has been closed since the armistice.

Firestone Increases Stock to $75,000,000

Will Sell Only Small Part of Authorized Issue—Enlargements Planned

AKRON, OHIO, Sept. 15—The Firestone Tire & Rubber Co. will increase its capitalization from $15,000,000 to $75,000,000. A resolution authorizing this increase passed without a dissenting vote at the recent annual meeting of stockholders. The company will sell $10,000,000 worth of 7 per cent preferred stock.

In explaining why such a small portion of the issue would be sold, H. S. Firestone, the president, said:

"We only contemplate selling $10,000,000 worth of the 7 per cent preferred stock, as that is a very large increase and is sufficient to meet our needs. It was less than three years ago that we increased our capital stock from $1,000,000 to $10,000,000. We had no thought then of using more than $5,000,000 of that preferred issue.

"With that experience in mind and not knowing what the future might bring forth, we decided to make our preferred capital stock sufficiently large so that we could issue more at any time without expense and complications and increasing it from the preferred issue of $10,000,000 to $50,000,000. It is necessary to have half as much common stock. Therefore it was necessary to increase the common stock issue to $25,000,000. We do not contemplate making any issue of the common stock at this time."

Firestone sales from Nov. 1, 1918, to Sept. 1, 1919, were $69,475,197.14 as against $63,821,046.67 for the same period last year or an increase of 9 per cent. This increase must be considered along with the fact that prices were reduced from 15 to 32 per cent. Sales in August, 1919, were the largest in the history of the company. An increase over August of last year of $2,456,994.30, or 31 per cent, was recorded.

Plans for the immediate construction of a $400,000 mechanical building were made public. This will be located in the rear of plant No. 2. Plant No. 2 was designed for a capacity of 10,000 tires daily, but with additional equipment, already ordered at a cost of $1,500,000, its capacity can be increased to 16,000 tires daily. Plant No. 1 will be converted from fabric tire manufacture to cord tire work.

MELHUISH IN AUTOMOTIVE SECURITIES

NEW YORK, Sept. 16—William F. Melhuish, Jr., who resigned some time ago as president of the Fulton Motor Truck Co., Farmingdale, N. Y., has also resigned as chairman of the board of directors, thus severing all connections with the company which he created three years ago. He has been in the automotive game for 16 years.

A new organization, to be known as Melhuish & Co., to specialize in marketing automotive securities, has been formed by William F. Melhuish, Sr., William F. Melhuish, Jr., and Walter G. Herr. It will occupy offices at 40 Wall Street. Walter G. Herr was formerly associated with a member of the Pittsburgh stock exchange.

France Has a New Fuel Oil Decree

PARIS, Sept. 4 (*Staff Correspondence*)—Crude oils are now admitted into France on practically the same import duties as coal, thus for the first time making their use commercially possible. According to the decree just published, the duty on these oils will be 80 centimes (16 cents) or 40 centimes (8 cents) per 100 kilogrammes. These new duties apply to gas oil, fuel oil, road oil, and to refined oils, lubrication oils and other heavy oils.

Certain conditions govern the importation and the use that shall be made of these oils. Thus the gas oil and fuel oil must be used for engines or for any form of combustion and the road oils must be used for road construction and maintenance. There are no conditions for the use of refined oils, paraffins and other heavy oils.

The practical result of this decree is that liquid fuel becomes possible for all factory uses, such as heating, hardening furnaces, Diesel engines, etc. One French firm is preparing to put on the market a steam truck burning crude oil and it is probable that this will also be applied to touring cars. The building of Diesel engines is likely to be undertaken on a big scale, for their use has now become a practical possibility.

AMERICAN BOSCH EARNINGS

NEW YORK, Sept. 15—The balance sheet of the American Bosch Magneto Corp. as of June 30, 1919, shows:

Assets

Cash	$731,940
Accounts receivable	615,019
Liberty bonds	678,940
Inventories, etc.	2,779,904
Stocks in other companies	1,501
Property and plant	2,230,950
Patents	500,000
Tracings	255,000
Prepaid expenses	60,306
Deferred charges	73,936
Total	$7,927,496

Liabilities

Accounts payable	$145,987
Accrued wages, etc.	22,705
Accrued taxes, insurance and unearned interest	81,769
Deferred credits	28,073
Capital stock and surplus	5,930,962
7 per cent serial gold notes, due 1920	538,000
7 per cent gold notes due 1921	590,000
7 per cent gold notes due 1922	590,000
Total	$7,927,496

WINTHER STOCK ISSUE

KENOSHA, WIS., Sept. 15—The Winther Motor Truck Co., Kenosha, Wis., is marketing a new issue of $500,000 of 7 per cent cumulative preferred stock to finance extensions of the works and provide for increased business. The authorized capital stock is $2,100,000, of which amount about one-half is outstanding.

Electric Truck to Solve Congestion

LONDON, Aug. 30 (*Special Correspondence*)—Bradford, York, like most other English manufacturing centers, is faced with the problem of congested truck traffic.

To meet the solution, there has been introduced an experimental battery truck, furnished also with a trolley pole for tapping the overhead live wire of the municipal tram service. Thus the truck can be run along tram routes by overhead power, and diverted for use on by-roads by running on storage power from its battery. It was stated that the running costs are low and that a rate of ten miles an hour can be maintained easily.

Bradford also seems likely to follow the lead of Liverpool in preparing a plan for linking up the tramway routes between that city and the East Lancashire cotton mills, working via Prescot and Rochdale and serving Manchester. The Bradford proposal is to provide a linked up traffic between Bradford, Leeds, Wakefield and Manchester.

It is stated that the battery truck is cheaper to operate in this work than either steam or gasoline vehicles.

Tractor Trial Will Feature Fuel Test

CENTREVILLE, MICH., Sept. 13—Fuel consumption in plowing and belt power tests will be made as the feature of the coming tractor demonstration to be held here Sept. 23-26 in conjunction with the St. Joseph County Fair. Already twenty machines have been entered for the trials that will be under the supervision of Prof. H. H. Musselman, professor of farm mechanics of the Michigan Agricultural College and the St. Joseph County Farm Bureau.

The fuel consumption tests, which will occupy the second day of the showing, will be conducted along novel lines. Each machine will be allotted a certain amount of fuel, as well as a certain sized tract for plowing. The plowing then will continue until the fuel has been exhausted. The comparative sizes of tracts plowed then will form the basis of the comparative reports. Details of the showing are being arranged by J. M. Wendt, county farm agent, whose office is here.

CHARTER AIRPLANE COMPANY

WILMINGTON, DEL., Sept. 15—The Detroit Manufacturers' Syndicate has been chartered under the laws of Delaware, with a capital of $1,000,000, to manufacture aircraft of all kinds. John W. Swartz, Robert L. Bailey and E. D. Nisser, all of Detroit, are the incorporators.

BOWER BEARING ADDITION

DETROIT, Sept. 15—An addition, 60 x 140 ft., is being erected for the Bower Roller Bearing Co. to provide necessary increased capacity.

Excise Tax Report on Motor Vehicles

WASHINGTON, Sept. 13—Excise taxes paid by manufacturers on the sale of automobiles and motorcycles for the fiscal year ended June 30 totaled $17,915,510.81, according to a report made public to-day by the Internal Revenue Collector. Automobile, truck and automobile wagon taxes total for the same period and the revenue derived from taxes on tires, parts and accessories, amounted to $4,903,276.18.

Taxes received in the four months, March 1 to June 30, 1919, from passenger automobiles for hire totaled $507,721.01. Excise taxes received by the Department of Internal Revenue for the four months ended June 30, 1919, including all taxes paid on the revenue laws of 1917, 1918 and 1919, totaled $29,262,864.79.

Michigan Licenses 40,000 Ahead

LANSING, MICH., Sept. 13—According to the number of permits issued by the state department during the first eight months of the year, Michigan should have approximately 325,000 licensed automobiles by Jan. 1.

The total motor vehicle registration this year, to date, includes 303,165 machines, of which 270,866 are listed as passenger cars, and 32,299 are commercial cars. The latter class includes trucks. Already the 1919 registration exceeds last year's record by more than 40,000, as 235,000 passenger cars and 26,517 commercial vehicles were licensed in 1918. The total fees collected from motor vehicle registrations last year, including chauffeurs' licenses, was $2,285,266.32, while the total fees collected so far this year amount to $3,382,611.76, all of which go for the construction and maintenance of roads. The number of motorcycle licenses decreased from 7816 to 7383.

PENNSYLVANIA RUBBER BUILDING

JEANNETTE, PA., Sept. 13—In order to offset the serious shortage of housing facilities for its workmen, the Pennsylvania Rubber Co. has purchased approximately 120 acres immediately south of its plant, on which it is erecting brick and stucco houses, which it sells to its workers on liberal terms. Twelve are already occupied and thirty-three more will be ready Nov. 1. Present plans are to continue until a minimum colony of 600 houses has been completed, with streets graded and all modern improvements in effect.

CONFERENCE FOR RESTORATION OF COMMERCE

ATLANTIC CITY, N. J., Sept. 13—The executive council of the International Trade Conference has invited 20,000 business men to attend a meeting called by the Chamber of Commerce of the United States, to be held here Sept. 30-Oct. 3, for the purpose of conferring with delegates from England, France, Italy and Belgium about plans for the restoration of commerce.

At a directors' meeting of the National Automobile Chamber of Commerce in New York this week, J. Walter Drake, one of the directors of the N. A. C. C. and president of the Hupp Motor Car Co., was chosen as the N. A. C. C. representative at the conference.

Excise Car Tax Five Years More

ST. LOUIS, MO., Sept. 13—The excise tax on automobiles probably will not be repealed for five years, according to the opinions at Washington, gathered by Harry G. Moock, business manager of the National Automobile Dealers' Association, on his recent visit there.

"While I was unable to see Chairman Fordney of the House Ways and Means Committee," Moock declared, "those in close touch with him believe that because of the enormous expenditures of the government, estimated by Treasurer Glass at about $6,000,000,000 a year, it probably would be five years before action could be taken to repeal the tax."

BETHLEHEM MOTORS REPORT

NEW YORK, Sept. 15—The income accounts of the Bethlehem Motors Corp., Allentown, Pa., and of the North American Motors Corp., Pottstown, Pa., which concerns recently merged, are given separately for the year ended June 30 last. The condensed income account for the Bethlehem Motors Corp. shows:

Sales	$3,516,028
Cost of product	2,750,516
Gross profit on total business	765,512
General and administrative expenses including provision for taxes	566,388
Net profits	199,124

Its balance sheet shows:

Assets

Cash	$93,646
Notes receivable	21,912
Accounts receivable	162,553

Liabilities

Notes payable	$757,945
Accounts payable	393,573
Reserve for income and taxes	100,000
Total assets and liabilities amount to	4,468,369

The condensed income account of the North American Motors Co. for the year ended June 30, 1919, shows:

Sales	$2,001,386
Cost of product	1,250,928
Gross profit	750,458
General and administrative expenses including provisions for taxes, etc.	384,832
Net profit	365,626

The balance sheet as of June 30, last, shows:

Assets

Cash	$28,026
Accounts receivable	48,604
Accounts payable	145,872
Reserve for income and excess profits taxes, estimated	90,000
Surplus	270,878
Total assets and liabilities	1,151,654

TRADE WITH HUNGARY

WASHINGTON, Sept. 15—The resumption of trade and communication between the United States and Hungary, effective Sept. 2, has been authorized, according to the War Trade Board Section of the Department of State.

Change Parts Tax For Manufacturer

New Revenue Ruling Does Away With Impost on Accessories for Makers

NEW YORK, Sept. 13—Federal taxes upon accessories and parts, including tires and inner tubes, have been so modified by a new ruling of the Commissioner of Internal Revenue that these parts may be sold to manufacturers without the imposition of a tax. However, the parts thus sold must be utilized by the purchasing manufacturer in making a complete car or machine, the tax then falling upon the completed machine.

These interpretations of the new ruling were made public here to-day by the National Automobile Chamber of Commerce and the Motor and Accessory Manufacturers' Association. The change in methods of administering the tax follows several conferences between officials of the revenue department with officers of the two motor organizations.

The excise impost, however, according to the ruling, becomes due when the goods are sold to a dealer or to any person or firm who will not use them for manufacture In this way, it was explained, the bogy of double taxation is done away with, as in many former instances the part was taxed when made and then retaxed when it was put into a car.

The decision announced is No. 2915 and bears the signature of J. H. Callan, acting Commissioner of Internal Revenue. It provides for a change in certificates by the maker, the new form of which may be obtained from the department.

CURTISS IN WAUKEGAN

CHICAGO, Sept. 12—The Curtiss Aeroplane & Motor Corp. have leased a 4-story building at Waukegan, containing 90,000 sq. ft., that will be used as headquarters. The site was chosen, it is said, because of its proximity to tracts available for landing fields. The building will be used for storing and assembling planes. About 40 machines have already arrived from the East.

ADDITION FOR IRON WORKS

MOLINE, ILL., Sept. 12—The purchase of the Moline baseball park will enable the Moline Iron Works to build an addition to its present plant which is operated at Second Avenue and Second Street, under the name of the Cooper Saddlery Hardware Co.

The plant will be continued in addition to a malleable foundry, 110 x 400 ft., and an enameling and finishing building, 110 x 360, of steel and glass, with cement tile roofs, to be erected at a cost of about $200,000. Approximately 250 men will be employed at the new plant It is expected that operations in the new buildings will start by the first of the year. The Moline Iron Works make castings for cars, trucks, tractors, and agricultural implements.

Holland Looks to U. S. for Cars

Visiting Dealer Says Little Is Expected from European Manufacturers for Months

NEW YORK, Sept. 15—"An automotive dealer with a motive, but without anything to sell," is the way in which Philip J. Stokvis, managing director of W. J. Stokvis, Ltd., of Arnhem, Amsterdam and The Hague, Holland, describes himself. He is here for the purpose of amending the latter condition by arranging agencies for cars, trucks and motorcycles.

Years of experience of European conditions in the automotive industry, past and present, indicate, in Stokvis' opinion, that there is little to be hoped for for some time to come. He has traveled widely throughout the continent during the past few months, visiting manufacturing centers, and he has come to the conclusion that it may be many months before production gets under way. When cars and trucks are available in appreciable numbers the European dealers' troubles are far from over. Prices have sky-rocketed to a point where the automobile has become a veritable luxury, available but to the select few. Truck prices may be advanced to such an extent that operation without actual loss will be an unsolvable problem. Therefore, Stockvis came to America.

Population and Area

There is one point which Stokvis wishes to emphasize while in this country. He finds that the average American export man is inclined to forget that the population of Holland is considerably less than that of New York City and that its area is but little more than one-half that of Lake Michigan. For these reasons, says Stokvis, the country can best be handled by a single responsible distributer or dealer. He mentions Holland as it is his primary interest, but he points out that there are other small countries in Europe in which similar conditions exist. At present the Holland import duty is 5 per cent *ad valorem*.

Hitherto, the automobile licenses granted in Holland have been based on cylinder bore, operating to the manifest disadvantage of the low-priced car with a bore of over 3½ in. A case in point is that of the Ford, which has been taxed so high on account of its 3¾ in. cylinder bore that but few are in use. A new law, which goes into force next January, will amend the registration regulations and will eliminate this disability.

Stokvis is no novice. He commenced with a plain bearing bicycle in 1885. He has been sole agent for the British Humber company since 1887. In 1895 he took over the Dunlop Tyre Co. agency for Holland and in 1897 commenced relations with the United States by importing Gormully & Jeffery bicycles.

In 1898, the firm imported a 2-cylinder English Daimler with solid tires and in 1900 Philip Stokvis, accompanied by Scheltema Beduin, the then world's tricycle champion, drove a pneumatic tired Daimler to Switzerland and back. Afterwards these two drove through Sweden and Norway, both trips being the first on record. An idea of conditions is gained by the fact that gasoline supplies had to be arranged for weeks in advance.

Stokvis has held the Panhard agency since 1901 and imported Dodge, Jeffery and National cars until overseas trade was stopped in 1917. He is president of the automobile dealers' section of the Netherlands Cycle Dealers' Association.

Stokvis expects to remain in this country for about two weeks, visiting Detroit and possibly other manufacturing centers.

Open New Transport Offices in Britain

LONDON, Aug. 30 (*Special Correspondence*)—The new Transport Ministry is to open motor transport bureaus throughout the country. The duty of these offices will be to collect all information regarding available transport and inform inquirers of its availability.

The transport department of the Ministry of Munitions is now using 4500 to 5000 lorries of three to five tons capacity, 45 steamers, and about 100 light vans. In case of urgent need they would be available for the transport of the country's food.

In the near future, the Department expects to receive at least 100 repaired lorries each week from Slough. They will be drafted out to the railways for general cartage, and the output will continue till the demand is satisfied.

The official statements confirm the anticipated trend and it is interesting to note that the much criticized Slough plan of government repair work is justifying itself under the management of Sam Wallace. Wallace came here from America and was loaned to the Associated Equipment Co., builders of the London motor buses, and to the Government to organize the Slough works.

AUSTRALIAN EXPORT INTERPRETATION

WASHINGTON, Sept. 15—Australian importers are complaining that American manufacturers who quote "f.o.b. New York" are interpreting this to mean merely delivery at the port of New York, whereas the Australian purchasers maintain that it must mean "free on board overseas vessel," according to correspondence received by the National Foreign Trade Council. The Australians claim that the quotation "f.o.b. port" means that the purchaser has no charges to meet except those connected with ocean freight and insurance.

There is no question, states the National Foreign Trade Council, that the original meaning of "f.o.b. port" means "free on board ship." All American exporters should make the meaning of the term, as they interpret it, unmistakably clear and explicit, so that there will be no adverse effect on American foreign trade as a result.

Spain Offers Fertile Field for Automobiles

Only 7000 Cars for Population of 20,000,000—High Fuel Consumption Obstacle

NEW YORK, Sept. 13—The Spanish market for American automobiles is expanding, according to James M. Nahon, Cadillac representative in Madrid and also in Tangier, Morocco, who stopped here this week on the way home from a visit to the Cadillac factory. Spain's excellent highways are a constant invitation to motoring, Nahon said, but up to date few outside the wealthy classes have become car owners because of the high cost of gasoline. This cost was $4 per gallon during the war and is now $1.

Nahon stated that Spain has only 7000 cars, a condition, along with the general wealth of the country and its population of 20,000,000, that offers a fertile field for automobile merchandising. The only obstacle to extensive selling of American cars, he declares, is their heavy consumption of fuel, in comparison with European makes of similar weight and horsepower.

Selling high priced American cars in Spain imposes upon the dealer in most cases, Nahon says, the building of special bodies, as the ordinary design does not offer "class" enough to suit the Castilian aristocracy. Because of this situation he imports more chassis than complete cars.

Great Foreign Market, Says Haynes Manager

KOKOMO, IND., Sept. 15—E. E. Bloom, export manager of the Haynes Automobile Co., has just returned from a two months' trip to Europe, where he visited practically all the countries of Europe in order to ascertain the automobile situation in foreign fields.

"France and England will not get into anything like quantity production for a year or more," declared Mr. Bloom, "and used cars in these countries are eagerly sought at fabulous prices. I know personally of a case in which a used Rolls-Royce sold for $20,000.

"The foreign market for American cars," he continued, "is greater than it has ever been. There is a 70 per cent duty on American cars in France, but even at that the dealers are anxious to secure cars. This high duty, which is really an embargo, will continue for probably six months longer. In England, although the embargo is lifted, the duty of 33⅓ per cent remains."

As a result of his visit Haynes dealers are now located in Norway, Sweden, Denmark, Holland, France, Belgium, England, Spain and Italy.

SCREW COMPANY BUYS PLANT

WALKERVILLE, ONT., Sept. 13—The plant of the Motor Products Co. here has been purchased by the Union Cap Screw Co., Detroit, Mich.

Splitdorf Service Boat That Made Second Place in the New York-Toronto Race

When C. S. Jones, flying in a JN-4 as a Splitdorf service plane, saw that his work of assistance and general service to the pilots who needed it in the New York-Toronto air race was about through, he entered his plane in the contest, since the rules allowed and there was sufficient time. He made his start from Toronto, and in 833½ minutes had completed the distance to Mineola, coming in second place for civilian flyers and winning a prize of $1,500

Washington-New York Air Mail 100 Per Cent

WASHINGTON, Sept. 15—The Washington-New York air mail service scored 100 per cent service for the month of August, it was announced to-day. Although many bad storms were encountered during the month, every machine made its scheduled flight each day.

Fifty-two flights were made, twenty-six each way. An average of 350 lb. of mail was carried on each flight, or a total of 18,200 lb. for the month.

This mail was carried at an average speed of 90 m.p.h., making the average length of the trip between this city and New York 2 hr. and 25 min.

The fastest flight was made Aug. 13, when Pilot Merrill K. Riddick carried 342 lb. of mail from New York to Washington in 1 hr. 55 min., at an average speed of more than 113 m.p.h.

SPECIAL BODIES FOR COLLINS

HUNTINGTON, L. I., Sept. 16—Announcement has been made that the car to be made by the Collins Motors, Inc., formed recently, will have all bodies especially designed to suit the individual purchaser. Two chassis are now in course of design.

ONEIDA ELECTRIC TRUCKS

GREEN BAY, WIS., Sept. 15—The Oneida Electric Truck Co. has been organized here with a capital stock of $300,000 preferred and 6000 shares of non-valued common, and will engage in the production of electric commercial cars. Among the organizers of the new company are executives and stockholders in the Oneida Motor Truck Co. of Green Bay, manufacturers of gas-engined trucks. The Oneida company will undertake the manufacturing operations of the new concern.

Officers of the Oneida Electric Truck Co. are: President, John T. Phillips; vice-president, F. H. Bogart, factory manager of the Oneida Motor Truck Co.; secretary, Samuel H. Cady; treasurer, William Hoberg; directors, Lafayette Markle, president and general manager of the Oneida Motor Truck Co.; Thomas Joannes, John Rose, Earle Murray, all of Green Bay.

It is stated that a fleet of the new electric trucks has been in operation for some time. It is expected that the new design will be in production by the end of the year on a quantity basis.

RACING CROWN FOR SHEEPSHEAD

NEW YORK, Sept. 15—The American automobile racing crown, emblematic of the world's speed championship, will be awarded at the Sheepshead Bay Speedway on Sept. 20. The season's final classic will include a 150-mile race and three 10-mile sprints.

The following entries have been received thus far:

Ralph De Palma	Packard
Ralph Mulford	Frontenac
Tommy Milton	Duesenberg
Joe Boyer	Duesenberg
Louis Chevrolet	Frontenac
Gaston Chevrolet	Frontenac
Ira Vail	Philbrin
Dave Lewis	Meteor
Art Klein	Peugeot
Ray Howard	Peugeot
Joe Thomas	Mercer
Toland Nicholson	Hudson

Late comers will probably include Joe Vetere, Jimmy Meyer, Denny Hickey, Eddie O'Donnell and Emil Thomas.

BALLOON RACE IN ST. LOUIS

ST. LOUIS, MO., Sept. 15—A national balloon race will start here on Oct. 1. The race is open to all American pilots. It will be conducted under the rules of the International Aeronautical Federation and sanctioned by the Aero Club of America. Prizes of $500, $300 and $200 will be awarded for first, second and third place.

Rohlfs Sets Unofficial Altitude Record

NEW YORK, Sept. 15—A new although unofficial altitude record was set here on Sept. 13 by Roland Rohlfs, flying a Curtiss "wasp," when he ascended to 34,200 ft. from Mineola, L. I. The announcement was made by Rohlfs to-day, who added that he expected shortly to attempt a similar flight under official supervision. The present credited record is 33,136 ft., made by Adjutant Casale, of the French Army.

Rohlfs reported that he had reached a temperature minimum of 44 deg. below zero at 34,000 ft., but that the thermometer climbed four degrees, to minus 40 at 34,200 ft. He recently made an official flight of 30,700 ft. but was prevented from going higher because the extreme cold chilled his engine. Since that time "shutters" have been fitted on the engine.

AIR ACCESSORIES FOR SALE

WASHINGTON, Sept. 15—The Director of Air Service is offering for sale the following motor accessories, located at Indianapolis, Ind.:

Amt.	Condition*	Description
6	AA	No. 3002 Interrupter insulated spring with crowned point
6	AA	No. 3001 Upper Inter Spring Assy.
13	AA	No. 2188 High Tension Lead.
32	AA	No. 42,613 Berkshire Magneto Straps
35	AA	No. 42,628 Berkshire Magneto Brackets
27	B	Berkshire Magnetos complete
3	C	L-38 Coil complete

*AA new, B fair, C poor.

For any additional information communicate with the nearest Bureau of Aircraft Production, attention Material Disposal and Salvage Division.

Increased Shipments in July and August

NEW YORK, Sept. 13—Reports showing the increased shipments of passenger cars and trucks during July and August, over the corresponding period of last year, were made public to-day by the traffic division of the National Automobile Chamber of Commerce. Shipments of 24,697 full carloads of automobiles in July this year against 13,741 in the same month a year ago were shown. The August figures, while incomplete, were announced as indicating a total of 21,000 carloads this year, in contrast with 13,868 in 1918.

Drive-aways from the factories were assuming large proportions at the present time, the report gave out, although there was said to be little change in the situation in regard to freight cars. That a shortage is feared was indicated in the statement that the regional director of the railroad administration was co-operating with the Detroit office of the organization in an effort to keep up deliveries.

Rubber Imports Gain Slightly in August

NEW YORK, Sept. 16—August imports of crude rubber are slightly in advance of the total for the same month of last year; they show a considerable drop from those of 1917 and they are well above those of 1916.

Comparison with the month's figures in 1917 and 1916 is not instructive for the reason that in these years conditions were abnormal. Rubber imports fluctuated in accord with disturbed conditions and shortage of shipping rather than for any other reason connected with supply and demand.

It can be assumed that the crude rubber trade is approximately normal; prices have advanced lately and demand is steady, although many of the larger tire makers have bought for delivery through next summer.

Official figures compiled by the Rubber Association of America give comparative totals for the past four years as follows:

	1919 Tons	1918 Tons	1917 Tons	1916 Tons
January	7,235	16,084	12,788	9,162
February	14,079	13,108	10,162	1,597
March	28,233	17,161	18,624	10,070
April	27,918	13,425	13,000	10,014
May	16,348	16,288	18,411	11,189
June	16,319	21,124	15,096	13,153
July	17,965	16,092	17,200	6,650
August	11,067	10,421	17,290	6,586

GOVERNMENT BRASS FOR SALE

WASHINGTON, Sept. 15—The War Department will sell its entire present surplus of brass, approximately 150,000,000 lb., under sealed bids. Each bureau of the War Department holding title to surplus stocks of brass will, from time to time, issue invitations to users of brass to submit bids on the whole or a part of that bureau's surplus stock. The zone and district offices of the bureaus which have brass stocks have been directed to issue invitations for bids, and some of these invitations are already being distributed.

The brass offered for sale was acquired by the War Department for use in the manufacture of such munitions as artillery cases, small arms cases, point-detonating fuses and shrapnel fuses. It consists principally of sheets, strips, bars and rods.

Tractor Engine Exports During July, 1919

Countries	Gasoline No.	Gasoline Value	Steam No.	Steam Value
Belgium	7	$8,238	3	$1,120
Denmark	143	127,511	..	.....
France	221	148,390	..	.....
Iceland and Faroe Island.	2	3,000	..	.....
Netherlands	13	3,533	..	.....
Norway	24	33,109	12	9,635
Portugal	1	6,000	..	.....
Spain	10	13,449	..	.....
Sweden	29	37,199	..	.....
England	154	70,124	15	17,850
Canada	273	216,634	8	10,818
Mexico	8	10,270	..	.....
Trinidad and Tobago	1	2,534	..	.....
Cuba	11	13,412	1	$77
French West Indies	3	3,320	..	.....
Haiti	4	8,472	..	.....
Argentina	1	1,000	..	.....
Brazil	3	3,680	..	.....
Chile	8	13,835	..	.....
British Guiana.	1	2,250	..	.....
Peru	38	28,645	..	.....
Venezuela	1	1,585	..	.....
Japan	5	2,692	..	.....
Russia in Asia.	1	6,000	..	.....
Australia	6	3,756	..	.....
Philippine Isls.	25	28,459	..	.....
British South Africa	1	1,022	..	.....
French Africa..	28	39,635	..	.....
Total	1,022	$837,954	39	$40,480

BUSHING MAKERS MEET

PHILADELPHIA, Sept. 16—A conference of bushing manufacturers has been called by the Motor and Accessory Manufacturers' Association for Sept. 30. It will be held at the Manufacturers' club here.

The question of bushing standardization will be discussed and definite suggestions for carrying out a standardization program will be considered. All bushing manufacturers have been invited to send representatives.

GOVERNMENT LIABILITY FOR AIRPLANE ACCIDENTS

WASHINGTON, Sept. 15—A bill introduced in the House to-day provides for the payment by the Government of damages for the death of a boy at Throop Borough, Pa., caused by the crash of a Government airplane.

Passage of the bill would serve as a precedent and make the Government liable for damages at all times if a Government owned airplane kills or injures a spectator.

AMERICAN BANKS IN BELGIUM

WASHINGTON, Sept. 15—Three American banks have been established in Belgium within the past three months to assist in developing commercial relations between the United States and Belgium. Previous to the war there were no branches of American banks in Belgium.

Exports of Automobile Tires from United States for July, 1919

Countries	Value
Austria-Hungary	.....
Belgium	$25,374
Denmark	101,230
Finland	.....
France	111,024
Gibraltar	175
Greece	542
Iceland and Faroe Islands	1,093
Italy	55,608
Netherlands	21,586
Norway	54,730
Portugal	565
Spain	14,008
Sweden	150,970
Switzerland	.....
England	102,453
Scotland	150
Bermuda	50
British Honduras	2,374
Canada	78,192
Costa Rica	1,190
Guatemala	40
Honduras	5,762
Nicaragua	3,353
Panama	44 184
Salvador	9,646
Mexico	42,643
Miquelon, Langley, etc.	.....
Newfoundland and Labrador	2,126
Barbados	1,272
Jamaica	5,839
Trinidad and Tobago	3,094
Other British West Indies	239
Cuba	102,807
Danish West Indies	2,082
Dutch West Indies	240
French West Indies	4,907
Haiti	1 394
Dominican Republic	5,554
Argentina	130,961
Bolivia	353
Brazil	75,024
Chile	14,293
Colombia	3,741
Ecuador	2 695
British Guiana	1,860
Paraguay	.....
Peru	21 354
Uruguay	51,484
Venezuela	12 291
China	18 079
Chosen	.....
British India	2,252
Straits Settlements	20,066
Other British East Indies	4,270
Dutch East Indies	69,933
French East Indies	.....
Hongkong	1,019
Japan	608
Russia in Asia	1,042
Siam	405
Australia	52,749
New Zealand	47 863
Other British Oceania	59
French Oceania	1,127
German Oceania	592
Philippine Islands	47 290
British West Africa	11,064
British South Africa	11,306
British East Africa	.....
Canary Islands	500
French Africa	.....
German Africa	.....
Liberia	32
Portuguese Africa	.....
Total	$1,570 017
Hawaii	$13 811
Porto Rico	132,865

SOUTHWEST TO HAVE SHOW

DALLAS, TEX., Sept. 15—Plans are made for the Southwest Motor Show to be held here the fortnight beginning Sept. 30. All available show space has been contracted for, the list of exhibitors comprising 40 firms which will show 50 makes of passenger car and 19 makes of truck. Accessory dealers to the number of 18 also will exhibit.

While the show will be held for the entire Southwest, it is being conducted primarily by the Dallas Automobile and Accessory Dealers' Association. In addition to the display of cars and trucks, numerous features of entertainment have been arranged.

July Trading Shows Export Expansions

Supplementary Table Illustrates Resumption of Business to Several European Countries

WASHINGTON, Sept. 12—Supplementing the general analysis of automotive exports for July, 1919, published in AUTOMOTIVE INDUSTRIES of Sept. 4, is the detailed tabulation given herewith. This contains details of exports from the United States to what were termed "other countries" in the earlier compilation.

These are of interest in that they indicate the resumption of business with European countries which have been entirely or almost cut off from this country for the past five years. They also show, so far as the totals for any one month can do so, that American commercial relations with the Far East are being maintained.

During the month, American makers have shipped 440 passenger cars, valued at $413,087 to Belgium; 276, worth $359,381, to Sweden; and 44, valued at $92,549, to Finland. Cars in considerable numbers have been exported to the Netherlands and to Portugal. Iceland has imported 17 cars, valued at $13,211. These additional figures illustrate the anxiety to obtain cars at the earliest possible moment, despite shipping limitations and adverse exchange.

Trade with the Far East also shows signs of expansion. Japan has imported 70 cars and 45 have been shipped to China during the month. These were valued respectively at $79,124 and $27,460.

Among Latin American countries not included in the former tabulation are Brazil with 110 cars, valued at $99,050, and Peru, which has imported 73 having a value of $53,683.

United States Exports of Cars, Trucks and Parts by Countries, During July, 1919

Countries:	Commercial Number	Commercial Value	Passenger Number	Passenger Value	Parts Value
Belgium	7	$16,861	440	$296,606	$33 875
Denmark	58	131,485	434	413 087	32.043
Finland	....	.....	44	92,549	767
France	162	799,532	7	25,700	105,188
Gibraltar	....	.....	1	575	41
Greece	2	2,359	12	21,725	2,313
Iceland and Faroe Islands	5	2.892	17	13,211	999
Italy	1	3,000	3	7,068	3 628
Netherlands	5	11,714	83	107,633	29,355
Norway	83	151,932	134	233 376	30 876
Portugal	....	.....	35	31,972	1,307
Spain	3	5,720	52	97,881	20 038
Sweden	37	50,390	276	359 381	11 437
Switzerland	....	.....	39	47,270	6,780
England	12	18,443	315	302,698	455 232
Scotland	....	.....	...	.....	2,380
Ireland	....	.....	1	1,150	.....
British Honduras	....	.....	1	500	138
Canada	135	235,279	612	662,548	1,251 909
Costa Rica	....	.....	5	3 580	1,342
Guatemala	....	.....	9	12,317	279
Honduras	1	3,600	4	3 261	2,820
Nicaragua	....	.....	3	1,775	2 930
Panama	1	2,700	19	20,297	10,588
Salvador	....	.....	6	8,433	8,483
Mexico	51	44,263	173	133 930	65 137
Newfoundland and Labrador	1	275	11	10 537	1,389
Barbados	....	.....	4	3,978	475
Jamaica	....	.....	5	4,624	8,144
Trinidad and Tobago	3	6 600	14	10,400	4,927
Other British West Indies	....	.....	1	500	1,100
Cuba	69	158,981	121	145 635	83 278
Danish West Indies	....	.....	8	3,900	174
Dutch West Indies	....	.....	...	.....	1,052
French West Indies	8	9,076	15	9 188	3,997
Haiti	....	.....	5	8,650	5 234
Dominican Republic	10	15,902	13	12,222	2,873
Argentina	7	30,662	45	70,603	20[illegible]4
Bolivia	....	.....	...	.....	1,261
Brazil	5	9,201	110	99,050	32,376
Chile	5	4,677	7	9 348	29 636
Colombia	....	.....	16	15,087	3 324
Ecuador	....	.....	14	17 202	1,314
British Guiana	18	9,060	2	1,267	3 454
Paraguay	....	.....	12	5,280	1,552
Peru	21	23,076	73	53 683	14,480
Uruguay	....	.....	43	68,996	12 414
Venezuela	6	4,919	26	24,861	12 173
Aden	....	.....	...	.....	20
China	36	147,832	45	27 460	4,594
British India	8	16 828	26b	270,424	24 269
Straits Settlements	10	20,289	28	36,238	4 066
Other British East Indies	....	.....	5	7,003	1 256
Dutch East Indies	38	72,915	57	105,423	19,988
French East Indies	....	.....	...	.....	1,506
Hongkong	....	.....	...	.....	704
Japan	16	22,781	70	79,194	44,328
Russia in Asia	4	1,250	...	.....	.....
Siam	....	.....	...	.....	511
Australia	....	.....	120	123,278	59 484
New Zealand	37	72,540	368	394,166	31,020
Other British Oceania	....	.....	2	1 380	169
French Oceania	....	.....	...	.....	951
German Oceania	....	.....	...	.....	13
Philippine Islands	21	43,661	166	158,558	10 951
British West Africa	11	11,352	47	68,530	9,713
British South Africa	....	.....	184	211 421	35 337
British East Africa	....	.....	5	5,392	1 257
Canary Islands	....	.....	...	.....	552
French Africa	8	11,256	17	13,445	8,413
German Africa	....	.....	...	.....	136
Total	905	$2,173 303	4,679	$4,975,446	$2,766,150
Shipments to Non-Contiguous Territory					
Alaska	5	$ 6.181	11	$ 7 677	$ 6.728
Hawaii	12	25,855	91	87 544	22.828
Porto Rico	21	39,943	78	95,102	24,741

This table supplements the one which appeared in the Sept. 4 issue of AUTOMOTIVE INDUSTRIES, *and gives figures of all the individual countries, including those generally grouped under the collective heading of "Other Countries."*

ARMY VEHICLES FOR PARADE

NEW YORK, Sept. 12—As no motor equipment is being brought back from France, nearly 1000 motor vehicles had to be brought here to make up the full divisional equipment of 1294 vehicles needed for Wednesday's parade of the First Division. The Pelham Bay Naval Training Station was used as the reception park, and there the equipment was mobilized, which included.

Ambulances	53
Cars—Light passenger	72
Heavy passenger	5
Reconnaissance	39
Staff observation	11
Trucks—Light delivery	16
1½-ton	3
2-ton	13
3-ton (Standard B)	378
Machine shop	1
Tank	23
Artillery supply	13
Artillery repair	3
Trailers—Water	7
Kitchen	31
Cargo	1
Motorcycles—Solo	38
With Sidecar	245
Bicycles	342

The final appearance of the Division as a fighting unit will take place Sept. 17 in Washington.

E. & W. ERECTING ADDITION

MILWAUKEE, Sept. 15—The E. & W. Mfg. Co., manufacturing commercial car attachments for passenger car chassis, has let contracts for the erection of a two-story plant addition, 50 x 100 ft.

NEW BUILDING FOR APCO

PROVIDENCE, R. I., Sept. 16—Work has been started on a new machine shop and assembling building for the Apco Mfg. Co., which will more than double present floor space and will be ready for occupancy early in October.

M. T. C. IN NEED OF TOOLS

WASHINGTON, Sept. 15—The Motor Transport Corps has furnished tools from its stores for vocational training purposes to such an extent that a shortage in its necessary equipment is impending. At present there are no funds available for purchase of more tools.

The Director of Sales has cabled for additional machine tool inventories and expects to make important sales to France and Belgium. Future large sales to Belgium depend upon prompt shipment of machinery already contracted for.

Plan Dunlop Tire Branch in United States

NEW YORK, Sept. 15—Financial advices received here by cable from London indicate that arrangements are under way by which the Beecham Trust of London will finance an American subsidiary corporation of the Dunlop Tyre Co. The issue was placed at about £2,000,000, although details were lacking whether or not the issue would be floated in England or here or in both places.

TRIANGLE PLANS 3½-TON TRUCK

ST. JOHNS, MICH., Sept. 9—The Triangle Truck Co. is considering the enlargement of its plant to double the present capacity. Plans are also under consideration for the manufacture of a new 3½-ton model truck.

WESTINGHOUSE EXHIBIT AT SAFETY COUNCIL

CLEVELAND, Sept. 13—The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., will stage an exhibit at the annual congress of the National Safety Council to be held here Sept. 29-Oct. 4, in which all forms of safety devices or models designed by the men of the company for use in the company's plant will be shown. The exhibit will also include certain products of the company which contain safety features.

TRAFFIC TRUCK ADDITION

ST. LOUIS, MO., Sept. 13—The Traffic Motor Truck Corp., which recently constructed a plant with a capacity of 50 trucks per day, is now building an addition to its present plant at 5200 N. Second Street. The new building will cover the block adjacent to the present factory and will afford 30,000 sq. ft. of floor space. In May the machine shop was enlarged.

HUPP SURPLUS FOR YEAR

DETROIT, Sept. 12—In its annual report for the year ended June 30, 1919, the Hupp Motor Car Corp. shows a surplus of $456,572 after preferred dividends were paid, as compared with $745,138 for the preceding year. The income account for the year compares as follows:

	1919	1913	1917
Net profit	$535,602	$836,691	$271,479
Preferred dividends	79,030	91,553	91,554
Surplus	$456,572	$745,138	$179,925

DIVIDENDS

The Electric Storage Battery Co., Cincinnati, quarterly dividend of $2 a share on both common and preferred stocks, payable Oct. 1 to stockholders of record Sept. 15.

American Bosch Magneto Corp., Springfield, Mass., has declared a dividend of $2 per share, payable on Oct. 1, to stockholders of record Sept. 15.

Current News of Factories

Notes of New Plants—Old Ones Enlarged

REX FOR NEW ORLEANS

NEW ORLEANS, LA., Sept. 13—The Rex Motor Car Manufacturing Co. has been organized to manufacture the Rex car, and its plant is already being erected here. Robert Booth, the English inventor of the Booth sectional export body and car designer, is president and general manager. Other officers are: E. C. Upton, H. C. Maynard, A. C. Sinclair, president of the Sinclair Motor Co. and designer of the Sinclair engine, and John Studebaker Lucas, corporation lawyer.

The company's present plans call for a car built of standard parts with the exception of the Rex-Sinclair 6-cylinder engine to be manufactured by the Sinclair Motor Co. here, and which has had the approval of the professors of engineering of Tulane University. The company expects to be in production by February.

RUBBER EXPANSION APPROVED

NEW YORK, Sept. 13—Stockholders of the United States Rubber Co, meeting at New Brunswick, N. J., have ratified the proposal of the directors that the capital stock of the company be increased to $300,000,000. This plan, as previously announced, calls for an increase of the first preferred stock from $70,000,000 to $100,000,000 and of the common stock from $36,000,000 to $200,000,000. The entire issue of second preferred stock, the authorized extent of which was $10,000,000, but which has been cut down to a nominal amount, will be retired. The holders of common stock will be offered $36,000,000 at par of the new common issue, according to the action of the stockholders.

DESIGN NEW FORD GASKET

DETROIT, MICH., Sept. 15—A copper asbestos gasket for Ford intake and exhaust manifolds, that replaces two parts ordinarily required, has been designed by the McCord Manufacturing Co. One side of the gasket slides into the manifold while the other side slides into the cylinder port. The two in one replaces the inlet and exhaust pipe gasket and the inlet and exhaust pipe gland. It is made of sheet copper, encasing asbestos.

MILLER TOP ENLARGES

CARO, MICH., Sept. 13—The Miller Top Co. will enlarge its plant by the addition of a two-story building, 87 x 37 ft. A one-story building, 60 x 100 ft, will be added on the eastern side of the factory.

BUFFALO BODY FORMED

BUFFALO, N. Y., Sept. 13—The Buffalo Body Corp. has been incorporated by R. J. MacKenzie and K. B. MacDonald, owners of the Buffalo Pressed Steel Co. It will manufacture high-grade closed automobile bodies. J. S. Burdick, formerly with the Locomobile Co., Bridgeport, Conn., has been made vice-president and will have active charge of engineering.

The new company will occupy the buildings on the 5½-acre site recently purchased, formerly occupied by the Buffalo School Furniture Co., containing about 150,000 sq. ft. of floor space.

ALBION BOLT IN NEW FACTORY

ALBION, MICH., Sept. 13—The Albion Bolt Co., which has been operating in the plant of the Hayes Wheel Co., will hereafter be housed in the plant of the Albion Chemical Works. The company, which is one of the newer industries in the city, has been making bolts and nuts, the entire output being taken by the Hayes company. Officials of the latter concern control the Albion Bolt.

MILLER STOCK INCREASE

AKRON, OHIO, Sept. 13—An increase of $800,000 in common stock of the Miller Rubber Co. has been authorized and stockholders are permitted to subscribe to the new issue at $100 par on a basis of one-fifth of their holdings. The company reports an increase of approximately 56 per cent in sales volume for the first seven months of 1919 compared with the same period of 1918.

OWEN MAKING 425 TIRES DAILY

BEDFORD, MASS., Sept. 15—Production of the Owen Tire & Rubber Co. has reached 425 tires a day. The plant employs 230 men, working three 8-hour shifts. The company is said to be about six months behind its orders.

The directorate of the company has been increased from five to seven by the election of O. M. Dickinson and William I. Creese. The other five directors are W. C. Owen, W. R. Green, Charles S. Reed, E. M. Blatz and W. J. Owen. It is the directors' plan to continue paying off the preferred dividends accrued since the last quarter in 1917, by paying 3½ per cent each quarter until paid off. The next dividend is payable Dec. 1 to stockholders of record Nov. 15.

McNAULL TIRE BANKRUPT

TOLEDO, Sept. 15—The McNaull Tire Co. has asked to be declared bankrupt in a petition filed in the Federal Court. The assets of the company are given at $245,464, while debts amount to $341,369. Creditors of importance are the Standard Parts Co., Cleveland, with a claim of $10,406, and F. R. Henderson & Co., with a claim of $73,835. The court appointed Attorney Frank Miller as receiver.

FINKELSTEIN IN EXPRESS DIVISION

NEW YORK, Sept. 13—The appointment of I. Finkelstein, formerly of the Division of Food and Markets of the State of New York, to the motor express division was announced to-day by the National Automobile Chamber of Commerce. Finkelstein will act as assistant to F. W. Fenn, who is in charge of the motor express division of the organization.

L. H. Earle, who was released from service as captain in the Ordnance Corps last spring, has been appointed eastern representative for the Buda Co., Harvey, Ill. with offices at 1216 Aeolian Hall, 33 West 42nd Street, New York. While in service Earle managed the government inspection of tractors and tanks. He was formerly connected with the Continental Motors Corp., first as designing engineer and later as sales manager. Previous to that he was chief engineer of the Abbott Motor Car Co. and with Chalmers at Detroit. Just before entering service he was in business for himself as Earle & Boggs, Inc., manufacturers' representatives.

Erwin L. Malone has been appointed Cleveland district representative of the Hess Steel Corp., Baltimore, Md. His present headquarters will be the Cleveland Athletic Club, Cleveland.

Charles C. Howison has been appointed New England representative for the Hudson Motor Specialties Co., Philadelphia.

William H. Huff, who has been with the Detroit Pressed Steel Co. for some time as assistant sales manager of the frame division, has been appointed advertising manager for both frame and wheel divisions of the company.

George L. Sullivan, for three years advertising manager of the Fisk Rubber Co., Chicopee Falls, Mass., has resigned to become associated with the J. Walter Thompson Co. advertising agency, New York.

Miss M. G. Webber, a member of the advertising department of the Fisk Rubber Co., Chicopee Falls, Mass., and for the past three years in charge of the outdoor advertising of the company, assumes the position of advertising manager for the Fisk company, succeeding George L. Sullivan, who resigned.

Dan McAvoy has been appointed manager of the Omaha branch of the Pennsylvania Rubber Co., succeeding O. A. Olson. For the past year he has been traveling representative of the company in Nebraska and Iowa.

Harry Newman, in the Chicago territory automobile trade for many years, and for the past few months in the sales department of the United Aircraft Engineering Corp., has been placed in charge of sales and advertising for that corporation.

William J. Hartman, for many years at the factory of the Advance Rubber Co., New York, has been placed in charge of the company's branch just opened at 721 S. Olive Street, Los Angeles, Cal.

Men of the Industry

Changes in Personnel and Position

A. B. Wagner, for the past five years Indianapolis branch manager of the Nordyke & Marmon Co, Indianapolis, has left the retail field to become assistant purchasing agent for the company, with headquarters at the Marmon plant there. He has been connected with the Nordyke & Marmon Co. since 1908. Wagner is also president of the Indianapolis Automobile Trade Association.

Maj. George R. Wadsworth has been elected second vice-president of the United Aircraft Engineering Corp. He is in charge of the transportation development work, which includes the establishment of municipal landing fields and air routes in all parts of the country for passenger carrying and light express. During the war he was chief engineer of the naval aircraft factory at Philadelphia.

Major Wadsworth and **Chance M. Vought** have been elected directors of the United Aircraft Corporation.

John Kelly, for nine and a half years New York district manager of the Edison Storage Battery Co., has been appointed general sales manager of the company, with headquarters in Orange, N. J. This promotion follows his appointment on July 1 as assistant general sales manager. He has had previous experience with the Westinghouse Storage Battery Co., the Firestone Tire & Rubber Co. and the Swinehart Tire & Rubber Co.

J. J. Wright, formerly manager of the Memphis branch of the Ford Motor Co. and later of the St. Louis Ford branch, has bought out the Platke & Beduhum Co., Ford dealers in Chicago. The business will be conducted as the J. J. Wright Motor Car Co.

Arthur C. Brenckle, Milwaukee, Wis., who was elected a director of the Olympian Motors Co., Pontiac, Mich., a year ago, has been elected secretary of the company and appointed sales manager. For two years he was president and manager of the Olympian Car Co., 180 Fifth Street, Milwaukee, distributer of the Olympian and the Denby truck.

C. J. Brethaur, formerly with the Commerce Motor Car Co., Buffalo, N. Y., and later with the Walden-Shaw Taxi Co., Chicago, has been made production manager of the Olympian Motor Car Co.

John F. Porter has joined the Cadillac Motor Car Co. as comptroller, succeeding Herman Kinnee, who has been advanced to assistant to the general manager. Mr. Porter comes to the Cadillac company from the Champion Ignition Co., Flint, where he was comptroller.

Twyman to Manage Nash Milwaukee Plant

MILWAUKEE, WIS., Sept. 13—The new factory which the Nash Motors Co., Kenosha, Wis., is establishing here will be under the management of P. W. Twyman, engineer and production expert who formerly was president and general manager of the Inter-State Motor Car Co., Muncie, Ind., which went out of business last year. This announcement was made by Charles W. Nash at the annual banquet of the Nash sales organization in the Middle Western states, held during State Fair week at Milwaukee.

Contracts will be let immediately for the first unit of the new plant, a machine shop and assembling floor, 200 x 600 ft., of brick and steel. A power and heating plant will be provided at the same time. Next spring other units will be started. The initial construction is based on a production of 100 cars a day. No details of the new Nash 4 have been divulged. It probably will make its debut at the annual winter shows.

ROST ORGANIZES SALES COMPANY

NEW YORK, Sept. 15—N. G. Rost, who has been general sales manager of the Duesenberg Motors Corp. since its organization in 1916, has resigned and has organized a sales company to represent several automotive manufacturers. The new organization will have headquarters in New York with a branch office in Detroit. Prior to 1916, Rost was sales manager of the Loew Victor Engine Co., Chicago, which was the predecessor of the Duesenberg corporation.

WHITE PLANT IN INDIANAPOLIS

INDIANAPOLIS, Sept. 15—Within a few days D. McCall White and E. C. Howard will move here from Detroit and begin operations on their new car in the plant recently purchased from the Stenotype Co. More than 150,000 sq. ft. of floor space are available

---

Beverly Mason Value has been appointed foreign sales manager of the J. I. Case Plow Works, Racine, Wis., with offices in New York City. He has been identified with T. A. Prouty, Inc.; with the Pittsburgh Testing Laboratories, first as assistant sales manager and later as assistant district manager. After returning from overseas duty as captain of infantry, he became vice-president of Tractors, Ltd.

L. M. Bradley, who has been allied with the automotive industry since its inception and until recently was general manager of the Motor and Accessory Manufacturers' Association, has become affiliated with the Frank Presbrey Co., advertising agency, New York.

Pierce G. Smith has been made vice-president of the American Malleables Co., Lancaster, N. Y., and Owosso, Mich. He was formerly sales manager.

B. R. McKinney has been appointed sales manager for the Morgan Manufacturing Co., Keene, N. H.

Calendar

SHOWS

Sept. 13-20—Cincinnati, O. Ninth Annual, Music Hall, Cincinnati Automobile Dealers' Assn., H. K. Shockley, Manager.

Sept. 15-20—Springfield, Mass. Eastern States Exposition.

Sept. 24-Oct. 4—New York, N.Y. New York Electrical Show. Grand Central Palace.

October—Ft. Dodge, Ia. Fall Motor Show. District Fair Grounds.

Oct. 6-11—Detroit, Mich. Closed Car Show. Arena Gardens. Detroit Auto Dealers' Assn., H. H. Shuart, Mgr.

Oct. 11-18—Pittsburgh, Pa. Fall Show.

Oct. 13—New York City. Opening of International Farm Tractor and Implement Exchange, Grand Central Palace.

Nov. 3-8—Chicago, Ill. Business Exhibit of Automotive Equipment Assn., Medinah Temple.

Nov. 16-23—New York Automobile Salon, Hotel Commodore.

January—New York. International Automobile Mfrs. Congress.

Jan. 3-10—New York, N. Y. Grand Central Palace. National Automobile Chamber of Commerce, S. A. Miles, Manager.

Jan. 3-10—New York City. Eighth Coast Artillery Armory, commercial cars and accessories.

Jan. 24-31—Chicago, Ill. Coliseum, Cars; Drexel Pavilion, Trucks; National Automobile Chamber of Commerce, S. A. Miles Manager.

Jan. 24-31—Chicago. International Amphitheater, commercial cars and accessories.

Feb. 23-28—Louisville, Ky. Twelfth annual exhibition. Louisville Automobile Dealers' Assn, First Regiment Armory.

February—Chicago. International Automobile Mfrs. Congress.

February—Deadwood, S. D. Annual show, Deadwood Business Club, F. R. Baldwin, Manager.

FOREIGN SHOWS

Aug. 23-Oct. 6—Toronto, Can. Cars, Trucks and Tractors, Arplanes and Motor Boats in conjunction with Canadian National Exhibition.

Sept. 10-24—Christiania, Norway. Exhibition of American goods at Trivoli Exhibition Grounds.

Sept. 21-27—London, Eng. Commercial Vehicles Exhibition, Olympia Society of Motor Mfrs. & Traders, Ltd.

Sept. 24-27—Lincoln, Eng. Tractor trial. Society of Motor Manufacturers and Traders, Ltd.

Sept. 24-27—Lincoln, Eng. Exhibition of tractors and agricultural vehicles, in connection with the tractor trials.

*Oct. 9-19—Paris, Grand Palais, International Automobile Mfrs. Congress.

Oct. 14-16—Ottawa, Ont., Can. Interprovincial Plowing Match and Tractor Demonstration.

November—Christchurch, N. Z. First National Motor.

Nov. 7-16—London. Olympia Motor Car Exhibition—Society of Motor Mfrs. and Traders.

December—Brusse's. International Automobile Mfrs. Congress.

January — Glasgow, Scotland. Scottish Motor Exhibition.

February — Manchester, Eng. North of England Motor Exhibition.

Feb. 23-March 6—Birmingham, Eng. British Industries Fair.

March—London, Eng. Motor Boat, Marine and Stationary Engine Exhibition.

March—Adelaide, Australia. All Australian Exhibition of motor vehicles, airplanes, engines and automotive equipment.

April or May—London, Eng. Commercial Vehicles Exhibition, Olympia.

April 3-May 4—Buenos Aires. Exposition of U. S. manufactures.

AUTOMOTIVE SHOWS AT FAIRS

Sept. 12-20—Peoria, Ill. Cars, trucks and tractors.

Sept. 13-20—Hutchinson, Kan. Cars, trucks and tractors.

Sept. 14-20—Sioux City, Ia. Cars, trucks and tractors.

Sept. 15-20 — Springfield, Mass. Cars, trucks and tractors. O. A. Nash, Asst. Gen. Manager.

Sept. 15-20—Yakima, Wash. Cars, trucks and tractors.

Sept. 16-19—Billings, Mont. Cars, trucks and tractors.

Sept. 18-21—Upper Creve Coeur Lake. Motor car show, St. Louis County Fair.

Sept. 20-27 — Oklahoma City, Okla. Cars, trucks and tractors. J. S. Malone General Manager.

Sept. 20-27—Memphis, Tenn. Cars, trucks and tractors.

Sept. 21-27—Salem, Ore. Car and truck show. Dealers' Motor Car Assn. of Oregon. Oregon State Fair.

Sept. 22-27—Allentown, Pa. Lehigh County Agricultural Assn.

Sept. 22-27—Pueblo, Colo. Cars, trucks and tractors. J. L. Beaman, Manager.

Sept. 22-27—Salem, Ore. Cars, trucks and tractors. Dealers' Motor Car Assn., M. O. Wilkins, Manager.

Sept. 24-Oct. 4—Kansas City, Kan. Cars, trucks and tractors.

Sept. 29-Oct. 4—Meridian, Miss. Cars and tractors. A. H. George, General Manager.

Sept. 29-Oct. 4 — Chattanooga, Tenn. Chattanooga Auto Dealers' Assn.

Sept. 29-Oct. 4—Muskogee, Okla. Cars, trucks and tractors.

Sept. 30-Oct. 3—Brockton, Mass. Cars.

Sept. 30-Oct. 4—Lancaster, Pa. Lancaster Fair Assn.

October—Columbia, S. C. Columbia Automobile Dealers' Assn.

Oct. 6-19—Dallas, Tex. Cars, Trucks and Tractors, Texas State Fair.

Oct. 20-25—Raleigh, N. C. Cars trucks and tractors.

Oct. 22-27—Shreveport, La. Cars, trucks and tractors.

Oct. 27-31 — Columbia, S. C. South Carolina State Fair Assn.

Nov. 3-8—Phoenix, Ariz. Tractor Demonstration, Arizona State Fair.

TRACTOR SHOWS

Sept. 15-20—Allentown, Pa. Lehigh County Agricultural Assn.

Sept. 16-21—Los Angeles, Cal. Regional Tractor Demonstration under the auspices of the National Implement & Vehicle Assn.

Sept. 22-28—Waterloo, Ia. Automobile show, in connection with Waterloo Dairy Cattle Congress; Black Hawk County Motor Trades Bureau, G. V. Orr, Secretary.

Sept. 23-26—Centreville, Mich. St. Joseph County Farm Bureau. Prof. H. H. Musselman, professor of Farm Mechanics at Michigan Agricultural College, manager.

Oct. 15 — Ellensburg, Wash. Tractor demonstration in charge of W. L. Davis, County Agricultural Agent.

Oct. 15-18—Charleston, W. Va. Tractor Demonstration, Kanawha County Fair.

Oct. 30—Yerington, Nev. Tractor demonstration, Lyon County Farm Bureau.

Nov. 22-29—Jacksonville, Fla. Florida State Fair and Exposition. B. K. Hanafourde, Manager.

February — Kansas City, Mo. Fifth Annual Kansas City Tractor Club, Guy H. Hall, Manager.

Feb. 9-14—Wichita, Kan. Tractor and Farm Machinery, Forum, Wichita Thresher-Tractor Club.

CONTESTS

Sept. 20—Sheepshead Bay, L. I. Speedway race.

Sept. 27—Allentown, Pa. Dirt track event.

Oct. 1.—St. Louis, Mo. National Balloon Race. International Aeronautical Federation. Sanctioned by Aero Club of America.

Oct. 4 — Trenton, N. J. Dirt track event.

Oct. 11—Cincinnati O. 300 mile Speedway race.

Oct. 11—Danbury, Conn. Dirt track event.

Nov. 2-3—El Paso, Texas. El Paso-Phoenix road race.

*Nov. 27—Los Angeles, Cal. Ascot Speedway race.

Dec. 29—Los Angeles, Cal. Ascot speedway race.

August 1920 — Paris, France, Grand Prix Race, Sporting Commission, Automobile Club of France.

CONVENTIONS

Sept. 21-25—New Orleans. Fifteenth Annual Convention of Associated Advertising Clubs of the World.

Sept. 22-24—Philadelphia. Annual Convention, National Association of Purchasing Agents. Bellevue-Stratford.

Sept. 22-27—Chicago. Annual Convention of Carriage Builders' National Assn., Hotel LaSalle.

Sept. 24-25—Sheffield, Eng. Institute of Metals.

Sept. 30-Oct. 3—Atlantic City, N. J. Convention of business men called by Chamber of Commerce of U. S. to confer with foreign delegates.

Oct. 1—Denver, Colo. Directors' Meeting, National Automobile Dealers' Assn.

Oct. 1-4—Cleveland. Eighth annual safety congress of National Safety Council.

Oct. 9-10—Jackson, Miss. Second Annual Convention, Louisiana-Mississippi Assn.

Oct. 14-17—Atlantic City, N. J. Twenty-fifth Annual Convention, Marlborough-Blenheim, National Hardware Association of the United States.

Oct. 15-17—Chicago. Twenty-sixth annual convention of the National Implement and Vehicle Assn., Congress Hotel.

Oct. 29—Washington, D. C. Annual Labor Conference provided by Peace Treaty.

November—London, Eng. Road Transport Congress and Exhibition.

Nov. 3-8—Chicago, Ill. Convention, Automotive Equipment Assn., Medinah Temple.

Nov. 7-8—Detroit. Meeting of National Assn. of Motor Truck Sales Managers, Hotel Statler.

Dec. 3-5—Cleveland, Ohio Automobile Trade Assn., Annual Convention.

January, 1920 — Washington, Pan-American conference.

Feb. 9-13—Louisville, Ky. Seventeenth Annual Convention American Road Builders' Assn., Tenth American Good Roads Congress and Eleventh National Good Roads Show.

May 15-20, 1920—San Francisco. Seventh National Foreign Trade Convention.

FOREIGN TRADE OPPORTUNITIES

WASHINGTON, Sept. 15—The Bureau of Foreign and Domestic Commerce, Department of Commerce, has received requests for automobiles or parts agencies of business from individuals and companies in foreign countries. These are listed below. For further information address the Bureau of Foreign and Domestic Commerce and specify the Foreign Trade Opportunity number.

India—Tractors. Quotations should be given c.i.f. city in India, 30382.

New Zealand—Passenger and commercial automobiles, accessories, rubber tires, etc., 30406.

Belgium — Motor cars. Quotations should be given c.i.f. Antwerp. Catalogs in French are requested. Correspondence may be in English. Reference, 30328.

Australia—Man wants position either as export manager of an American exporting firm or as representative of manufacturers and exporters for the sale of automobiles, motor trucks, tires and accessories, steel products, etc. Reference, 30237.

Uruguay—Catalogs, particulars and other details of automobiles, especially lighter machines. Reference, 35038.

Belgium—Automobiles not yet represented in that country. Correspondence should be in French, 30363.